intelleflex®

XC3 Technology™

HMR-9090 User Guide

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Caution
This device should be operated with a minimum distance of at least 32 cm between its antennas and a person's body in keeping with RF exposure limits in Council Recommendation 1999/519/EU

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Table of Contents

Chapter 1 About This Guide

1.1 Introduction

This guide provides information about using the HMR-9090.

Screens and windows pictured in this guide are samples and can differ from actual screens.

1.2 Chapter Descriptions

Topics covered in this guide are as follows:

- Chapter 1, About This Guide, information on the HMR-9090 user guide
- Chapter 2, Getting Started, charging the HMR battery and resetting the HMR
- Chapter 3, Accessories, describes the accessories available for the HMR
- Chapter 4, Operating the HMR, how to use the HMR
- Chapter 5, Bluetooth, setup Bluetooth on the HMR
- Chapter 6, Wireless Applications, configure Wi-Fi and related applications
- Chapter 7, ActiveSync, exchange information with a host computer
- Chapter 8, Application Deployment, package and deploy applications
- Chapter 9, Staging and Provisioning, describes Rapid Deployment, AirBEAM Smart, and MSP Agent
- Chapter 10, Troubleshooting, provides troubleshooting solutions

1.3 Notational Conventions

The following conventions are used in this document:

- "RFID Reader", "reader", or "HMR" refers to the Intelleflex HMR-9090 RFID reader.
- Italics are used to highlight the following:
  - Chapters and sections in this guide
  - Related documents
- Bold text is used to highlight the following:
  - Dialog box, window and screen names
  - Drop-down list and list box names
  - Check box and radio button names
  - Icons on a screen
  - Key names on a keypad
  - Button names on a screen
- Bullets (●) indicate:
  - Action items
  - Lists of alternatives
  - Lists of required steps that are not necessarily sequential
- Sequential lists (e.g., those that describe step-by-step procedures) appear as numbered lists.

1.4 Related Documents and Software

The following documents provide more information about the HMR-9090 reader.

1. HMR-9090 Quick Start Guide, DOC ID: TS-07-1210
2. ActiveSync software, available at: http://www.microsoft.com

Chapter 2 Getting Started

2.1 Introduction

This chapter lists the accessories for the HMR and explains how to install and charge the batteries, replace the strap, and start the HMR for the first time.

2.2 Unpacking the HMR

Carefully remove all protective material from around the HMR and save the shipping container for later storage and shipping.

Verify that you received all equipment listed below:

- HMR
- Lithium-ion battery
- Strap, attached to the HMR
- Stylus, in the stylus silo
- HMR-9090 User Guide
- HMR-9090 Quick Start Guide

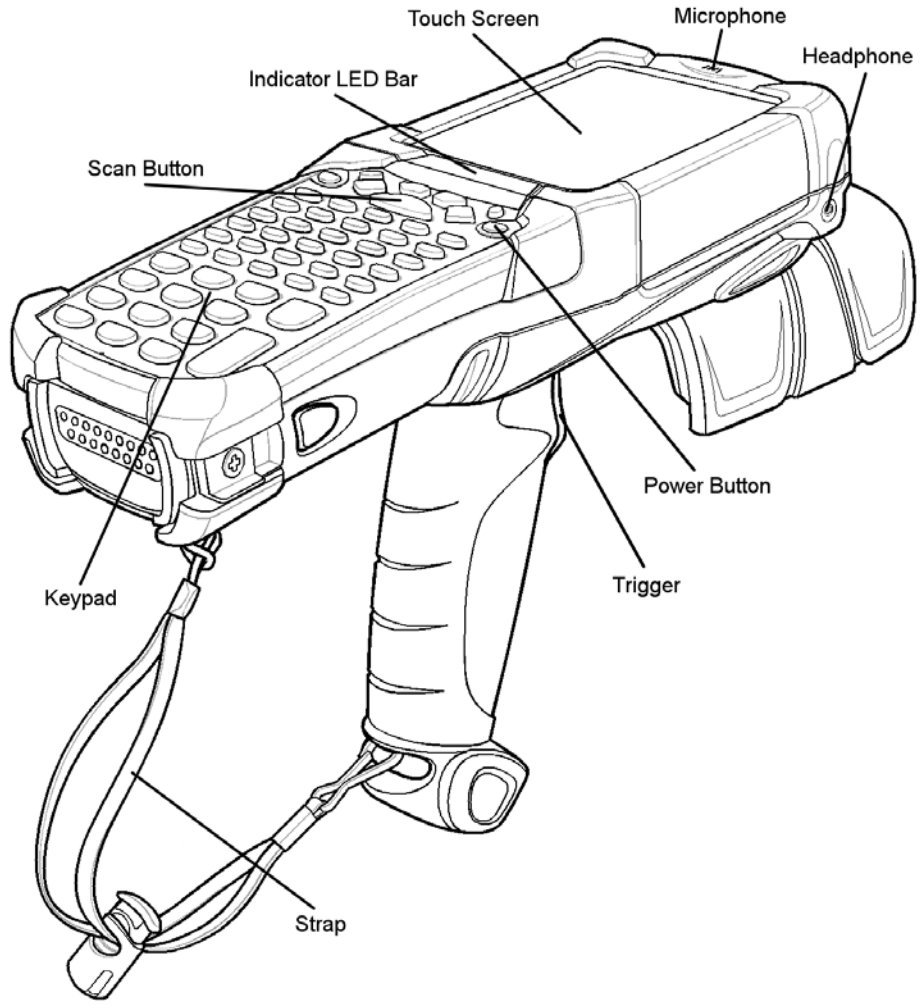


Figure 2-1 HMR

2.3 Accessories

Table 2-1: HMR Accessories

Accessory	Description
Cable Adapter Module (CAM)	Snap-on required to connect the following cables to the HMR. 1. AC line cord (country-specific) and power supply, charges the HMR. 2. Auto charge cable, charges the HMR using a vehicle's cigarette lighter. 3. DEX cable, connects the HMR to a vending machine. 4. Serial cable, adds serial communication capabilities. 5. USB cable, adds USB communication capabilities. 6. Printer cable, adds printer communication capabilities.
Four Slot Charge Only Cradle	Charges the HMR main battery.
Four Slot Ethernet Cradle	Charges the HMR main battery and synchronizes the HMR with a host computer through an Ethernet connection.
Four Slot Spare Battery Charger	Charges up to four HMR spare batteries.
Magnetic Stripe Reader (MSR)	Snaps on to the HMR and adds magstripe read capabilities.
Modem Module	Enables data communication between the HMR and a host computer, remotely through the phone lines, and synchronizes information between the HMR and a host computer.
Multimedia Card (MMC)	Provides secondary non-volatile storage.
Single Slot Serial/USB Cradle	Charges the HMR main battery and a spare battery. It also synchronizes the HMR with a host computer through either a serial or a USB connection.
Software	*Symbol Mobility Developer Kits* available at: http://support.symbol.com.
Spare lithium-ion battery	Replacement battery.
Stylus	Performs pen functions.
Universal Battery Charger Adapter	Adapts the UBC for use with the Series 9000 batteries.
Wall Mounting Bracket and Shelf Slide	Use for wall mounting applications.

2.4 Getting Started

In order to start using the HMR for the first time:

- Install the main battery
- Charge the main battery and backup battery
- Start the HMR
- Configure the HMR

The main battery can be charged before or after it is installed. Use one of the spare battery chargers to charge the main battery (out of the HMR), or one of the cradles to charge the main battery installed in the HMR.

2.5 Installing and Removing the Main Battery

Installing the Main Battery

Before using the HMR, install a lithium-ion battery by sliding the battery into the HMR as shown.

Ensure the battery is fully inserted. Two audible clicks can be heard as the battery is fully inserted. A partially inserted battery may result in unintentional data loss.

When a battery is fully inserted in a HMR for the first time the device boots and powers on automatically.

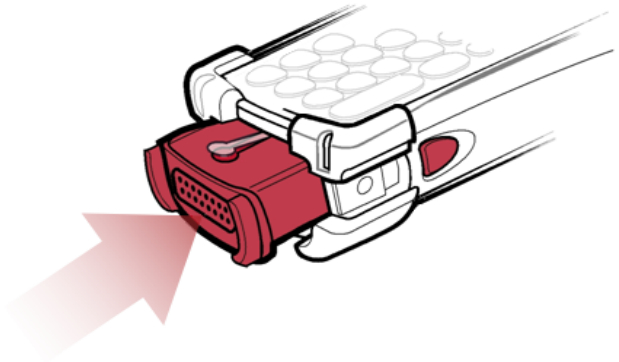


Figure 2-2 Installing the Main Battery

Removing the Main Battery

To remove the main battery:

1. Prior to removing the battery, press the red **Power** button to place the HMR in the suspend mode.
2. Simultaneously press both primary battery releases. The battery partially ejects from the HMR.
3. Pause 3-4 seconds while the HMR performs battery removal shutdown.
4. Press the secondary battery release, on top of the battery, and slide the battery out of the HMR.

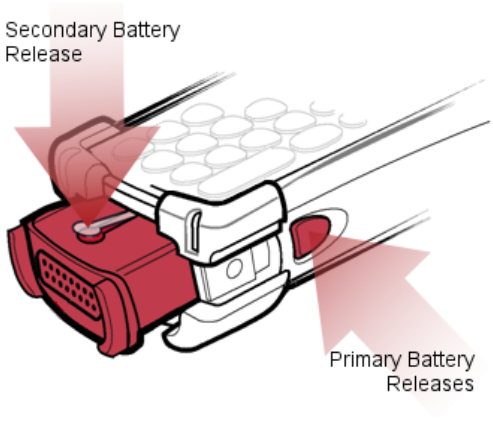


Figure 2-3 Removing the Main Battery

2.6 Charging the Battery

Charging the Main Battery and Memory Backup Battery

Before using the HMR for the first time, charge the main battery until the amber charge indicator light remains lit (see Table 2-2 for charge status indications). Charge time is less than four hours. The HMR can be charged using a cradle, the CAM with a charging cable, or the MSR with the appropriate power supply.

The HMR is equipped with a memory backup battery which automatically charges from the fully-charged main battery. When the HMR is used for the first time, the backup battery requires approximately 15 hours to fully charge. This is also true any time the backup battery is discharged, which occurs when the main battery is removed for several hours. The backup battery retains data in memory for at least 30 minutes when the HMR's main battery is removed. When the HMR reaches a very low battery state, the combination of main battery and backup battery retains data in memory for at least 72 hours.

Do not remove the main battery within the first 15 hours of use. If the main battery is removed before the backup battery is fully charged, data may be lost.

Use the following to charge batteries:

1. Cradles: The HMR slips into the cradles for charging the battery in the HMR (and spare batteries, where applicable).
   a. Single Slot Serial/USB Cradle
   b. Four Slot Ethernet Cradle and Four Slot Charge Only Cradles

- Accessories: The HMR's snap-on accessories provide charging capability, when used with one of the accessory charging cables.
  a. CAM
  b. MSR
- Chargers: The HMR's spare battery charging accessories are used to charge batteries that are removed from the HMR.
  a. Single Slot Serial/USB Cradle
  b. Four Slot Spare Battery Charger
  c. Universal Battery Charger (UBC)

To achieve the best battery life in HMRs with multiple radios, turn off the radios that are not being used. This can be accomplished via the SetDevicePower function in the API (refer to the SMDK Help File for Symbol Mobile Computers).

Charging the Main Battery

Charge the main battery in the HMR using a cradle, the CAM with a charging cable, or the MSR with the appropriate power supply.

- Ensure the accessory used to charge the main battery is connected to the appropriate power source (see Chapter Chapter 3, Accessories for setup information).
- Insert the HMR into a cradle or attach the appropriate snap-on module.
- The HMR starts to charge automatically. The amber charge LED, in the Indicator LED Bar, lights to show the charge status. See Table 2-2 for charging indications.

The main battery usually charges in less than four hours.

Table 2-2: HMR LED Charge Indicators

LED	Indication
Off	HMR not in cradle or the HMR is not attached to the CAM or MSR. HMR not placed correctly. Charger is not powered.
Fast Blinking Amber	Error in charging; check placement of the HMR.
Slow Blinking Amber	HMR is charging.
Solid Amber	Charging complete.

Charging Spare Batteries

Use the following three accessories to charge spare batteries:

- Single Slot Serial/USB Cradle
- Four Slot Spare Battery Charger
- UBC Adapter

To charge a spare battery:

- Ensure the accessory used to charge the spare battery is connected to the appropriate power source (see Chapter Chapter 3, Accessories for setup information).
- Insert the spare battery into the accessory's spare battery charging slot with the charging contacts facing down (over the charging pins) and gently press down on the battery to ensure proper contact.
- The battery starts to charge automatically. The amber charge LED on the accessory lights to show the charge status. See Chapter Chapter 3, Accessories for charging indications for the accessory.

The battery usually fully charges in less than four hours.

2.7 Starting the HMR

Press the red **Power** button to turn on the HMR. If the HMR does not power on, perform a cold boot. See Checking Battery Status on page 18 for cold boot procedures.

When a battery is fully inserted in a HMR for the first time, upon the first power up, the device boots and powers on automatically.

When the HMR is powered on for the first time, it initializes its system. The *Symbol* splash screen (Figure 2-4) appears for a short period of time.

Figure 2-4 Symbol Splash Window

2.8 Calibrating the Screen

To calibrate the screen so the cursor on the touch screen aligns with the tip of the stylus:

- Using the stylus carefully press and briefly hold the tip of the stylus on the center of each target that appears on the screen.

To re-calibrate the screen at anytime, press the blue FUNC and ESC keys on the HMR to launch the calibration screen application.

- Repeat as the target moves around the screen or press **ESC** to cancel.

2.9 Checking Battery Status

- To check whether the main battery or backup battery in the HMR is charged, tap **Start** > **Settings** > **System** Tab > **Power** icon to display the **Battery Status** window.

To save battery power, set the HMR to turn off after a specified number of minutes.

To perform a cold boot:

1. Press the primary battery release on the HMR to partially eject the battery from the HMR.
2. While the battery is partially released, simultaneously press and release the trigger and power button.
3. Push the battery to fully re-insert it in the HMR. One audible click can be heard as the battery is fully inserted.
4. The HMR initializes.

2.10 Battery Management

Battery Saving Tips

1. Leave the HMR connected to AC power at all times when not in use.
2. Set the HMR to turn off after a short period of non-use.
3. Set the display and keyboard backlight to turn off after a short period of non-use.
4. Turn off all wireless radio activity when not in use.
5. Power off the HMR when charging to charge at a faster rate.

2.11 Stylus

To remove the stylus, pull the stylus cord down and outward to remove the stylus.

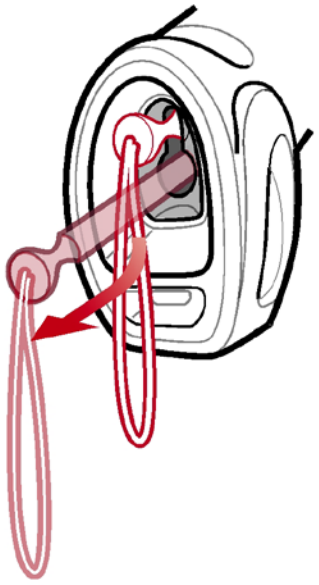


Figure 2-5 Removing the Stylus

Use the HMR stylus for selecting items and entering information. The stylus functions as a mouse.

1. Tap: Touch the screen once with the stylus to press option buttons and open menu items.
2. Tap and Hold: Tap and hold the stylus on an item to see a list of actions available for that item. On the pop-up menu that appears, tap the action to perform.
3. Drag: Hold the stylus on the screen and drag across the screen to select text and images. Drag in a list to select multiple items.

2.12 HMR Strap

The strap may be moved to either the left or right side of the HMR to suit user preferences.

To reposition the strap:

1. Disconnect the metal clip at the handle.
2. Open strap loop and slide the handstrap through the loop.
3. Slide the loop out of the connector post.
4. Reverse the procedure to re-attach the strap. Two strap connectors are provided on the HMR's main body. The handstrap may be attached to either connector.

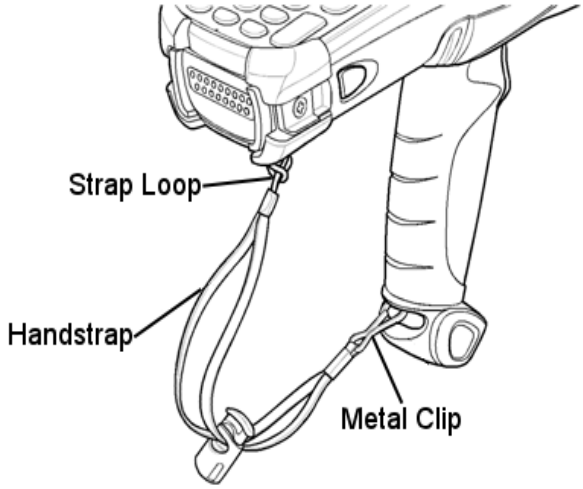


Figure 2-6 Reposition the Strap

2.13 Changing the Power Settings

To set the HMR to turn off after a short period of non-use:

- Tap **Start** > **Settings** > **System** tab > **Power** icon > **Advanced** tab.
- Select **On battery power: Turn off device if not used for:** check box and select a value from the drop-down list box.
- Tap **OK**.

2.14 Changing the Display Backlight Settings

To change the display backlight settings in order to conserve more battery power:

- Tap **Start** > **Settings** > **System** tab > **Backlight** icon > **Battery Power** tab.
- Select the **On battery power: Disable backlight if not used for:** check box and select a value from the drop-down list box.
- Tap the **Brightness** tab.
- Tap the **Disable backlight** check box to completely turn off the display backlight.
- Use the slider to set the brightness of the backlight. Set it to a low value to save battery power.
- Tap **OK**.

2.15 Changing the Keypad Backlight Settings

To change the keypad backlight settings in order to conserve more battery power:

- Tap **Start** > **Settings** > **System** tab > **Keylight** icon > **Battery Power** tab.
- Select the **On battery power: Disable keylight if not used for:** check box and select a value from the drop-down list box.
- Tap the **Advanced** tab.
- Tap the **Disable keylight** check box to completely turn off the display backlight.
- Tap **OK**.

2.16 Turning the Radios Off

On Devices with Mobile 5.0 AKU 1.0

WLAN Radio

To turn off the WLAN radio tap the **Signal Strength** icon at the bottom of the Today screen and select **Disable Radio**. A red X appears across the icon indicating that the radio is disabled (off).

To turn the radio back on, tap the **Signal Strength** icon at the bottom of the Today screen and select **Enable Radio**. The red X disappears from the icon indicating that the radio is enabled (on).

Bluetooth and WWAN Radios

The Flight Mode feature only turns off the WWAN and Bluetooth radios. The WLAN radio must be turned off separately.

To turn off the Bluetooth and WAN radios:

- Tap the **Connectivity** icon (on non-WAN devices) or the **Antenna/Signal** icon (on WAN devices) and select **Turn On Flight Mode**.

To turn the Bluetooth and WAN radios back on:

- Tap the **Connectivity** icon (on non-WAN devices) or the **Antenna/Signal** icon (on WAN devices) and select **Turn Off Flight Mode**.

On Devices with Mobile 5.0 AKU 2.2 or higher

Windows Mobile 5.0 devices with AKU 2.2 or higher include **Wireless Manager**, which provides a simple method of enabling, disabling, and configuring all the device's wireless capabilities in one place.

To open Wireless Manager, tap the Connectivity icon.

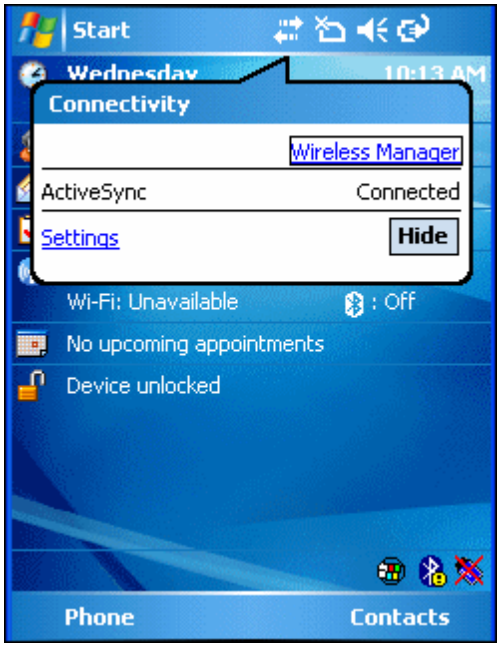


Figure 2-7 Opening Wireless Manager

Select **Wireless Manager**.

Figure 2-8 Wireless Manager Window

To enable or disable a wireless connection, tap its blue bar.

To enable or disable all wireless connections, tap and hold the **All** bar.

To configure settings for a connection, tap **Menu**.

Figure 2-9 Wireless Manager Menu

2.17 Wireless Applications

Wireless Local Area Networks (WLANs) allow HMRs to communicate wirelessly and send captured data to a host device in real time. Before using the HMR on a WLAN, the

facility must be set up with the required hardware to run the wireless LAN and the HMR must be configured. Refer to the documentation provided with the access points (APs) for instructions on setting up the hardware.

To configure the HMR, a set of wireless applications provide the tools to configure and test the wireless radio in the HMR. The **Wireless Application** menu on the task tray provides the following wireless applications:

1. Wireless Status
2. Wireless Diagnostics
3. Find WLANs
4. Manage Profiles
5. Options
6. Enable/Disable Radio
7. Log On/Off

Tap the **Signal Strength** icon to display the **Wireless Applications** menu.

Figure 2-10 Wireless Applications Menu

For more information refer to Chapter 6.

2.18 ActiveSync

To communicate with various host devices, install Microsoft ActiveSync (version 4.1 or higher) on the host computer. Use ActiveSync to synchronize information on the HMR with information on the host computer. Changes made on the HMR or host computer appear in both places after synchronization.

ActiveSync software:

- Allows working with HMR-compatible host applications on the host computer. ActiveSync replicates data from the HMR so the host application can view, enter, and modify data on the HMR.
- Synchronizes files between the HMR and host computer, converting the files to the correct format.
- Backs up the data stored on the HMR. Synchronization is a one-step procedure that ensures the data is always safe and up-to-date.
- Copies (rather than synchronizes) files between the HMR and host computer.
- Controls when synchronization occurs by selecting a synchronization mode, e.g., set to synchronize continually while the HMR is connected to the host computer, or set to only synchronize on command.
- Selects the types of information to synchronize and control how much data is synchronized.

Additional information on ActiveSync is located in Chapter 7.

Chapter 3 Accessories

3.1 Introduction

The series 9000 accessories provide a wide variety of product support capabilities. Accessories include cradles, keypads, Magnetic Stripe Reader (MSR) and Cable Adapter Module (CAM) snap-on, four slot spare battery charger, headphone, Multimedia Card (MMC), Secure Device (SD) card, Universal Battery Charger (UBC) adapter, and wall mounting bracket and shelf slide.

Keypads

The HMR has interchangeable modular keypads. However, only the *53-Key RFID* keypad can be used with the HMR. The modular keypad can be changed in the field as necessary.

- 53-key RFID keypad

Cradles

⚠ Single Slot Serial/USB cradle charges the HMR main battery and a spare battery. It also synchronizes the HMR with a hot computer through either a serial or a USB connection.

- Four Slot Charge Only cradle charges the HMR main battery.
- Four Slot Ethernet cradle charges the HMR main battery and synchronizes the HMR with a host computer through an Ethernet connection.

Miscellaneous

1. Four Slot Spare Battery Charger charges up to four HMR spare batteries.
2. Headphone can be used in noisy environments.
3. Modem Module enables data communication between the HMR and a host computer, remotely through the phone lines, and synchronizes information between the HMR and a host computer.
4. Multimedia Card (MMC) provides secondary non-volatile storage. (An SD card may also be used.)
5. UBC adapter adapts the UBC for use with the HMR batteries.
6. Wall Mounting Bracket and Shelf Slide can be used for wall mounting applications.

Snap-on Modules

- MSR connects on to the HMR and adds magstripe read capabilities.
- CAM connects on to the HMR and is used to connect cables to the HMR.

Both of the snap-on modules use the cables listed below:

- AC line cord (country-specific) and power supply, charges the HMR.
- Auto charge cable, charges the HMR using a vehicle cigarette lighter.
- DEX cable, connects the HMR to a vending machine.
- Serial cable, adds serial communication capabilities.
- USB cable, adds USB communication capabilities.
- Printer cable, adds printer communication capabilities.

3.2 Keypad

The HMR has a modular keypad. The modular keypad can be removed in the field as necessary. Keypad removal is required to replace the MMC card.

⚠ Do not remove the keypad while the HMR is on and do not operate the HMR with the keypad detached. Follow proper Electro-Static Discharge (ESD) precautions to avoid damaging the MMC and SD card. Proper ESD precautions include, but are not limited to, working on an ESD mat and ensuring that the operator is properly grounded.

Keypad Removal

- Press the **Power** button to suspend the HMR.
- Remove the two keypad screws. Slide the keypad down and lift up.

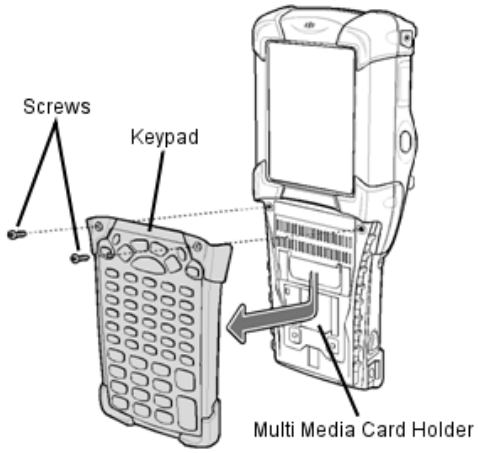


Figure 3-1 Removing the Keypad

⚠ Do not apply more than 4 in-lbs of torque when tightening the keypad screws.

- Replace the keypad and re-attach using the two screws.

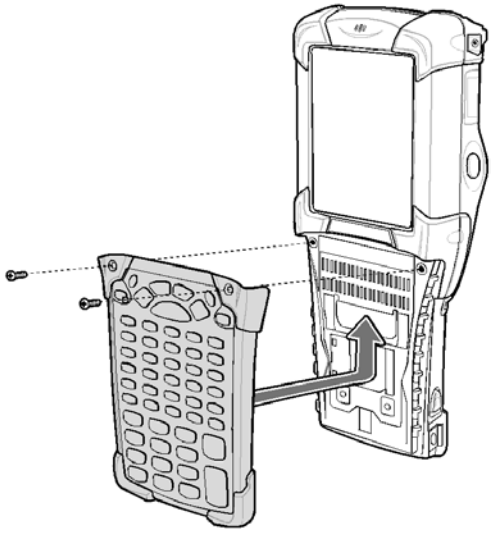


Figure 3-2 Installing the Keypad

- Perform a cold boot.

3.3 Multi Media Card (MMC) / Secure Device (SD) Card

The MMC provides secondary non-volatile storage. The MMC is located under the keypad (see Figure 3-1 on page 25).

SD cards are inter-operable with MMC cards and can also be used in HMRs.

⚠ Do not remove the keypad while the HMR is on and do not operate the HMR with the keypad detached. Follow proper ESD precautions to avoid damaging the MMC/SD. Proper ESD precautions include, but are not limited to, working on an ESD mat and ensuring that the operator is properly grounded.

To insert the MMC/SD card:

- Press the **Power** button to suspend the HMR.
- Remove the two keypad screws and slide the keypad down and lift off (see Figure 3-1 on page 25).
- Lift the MMC/SD retaining door.
- Position the MMC/SD card, with the contacts down, into the MMC/SD holder. The MMC/SD card corner notch fits into the holder only one way.
- Snap the retaining door closed.

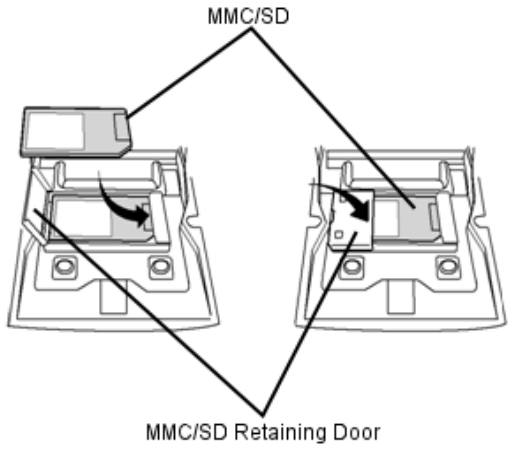


Figure 3-3 Inserting the MMC/SD

⚠ Do not apply more than 4 in-lbs of torque when tightening the keypad screws.

- Replace the keypad and re-attach using the two screws (see Figure 3-2 on page 25).
- Perform a warm boot.

3.4 Single Slot Serial/USB Cradle

⚠ Ensure that you follow the guidelines for battery safety described in Battery Safety Guidelines on page 186.

This section describes how to set up and use a Single Slot Serial/USB cradle with the HMR. For serial and USB communication setup procedures see Serial Communication Setup on page 56.

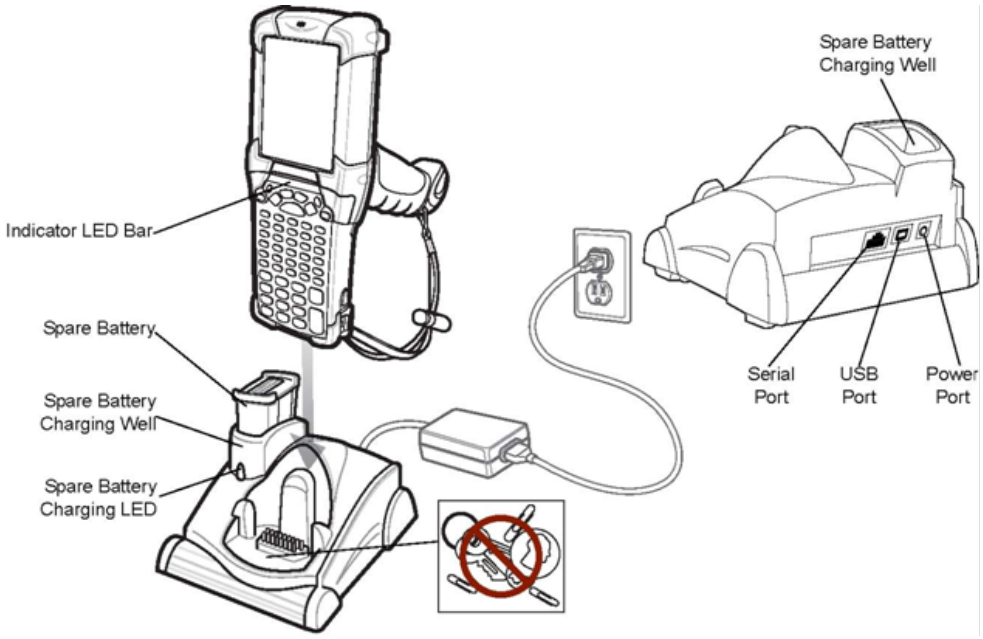


Figure 3-4 Single Slot Serial/USB Cradle

⚠ Do not place coins, keys, or paper clips in the cradle well.

The Single Slot Serial/USB Cradle:

Provides 15VDC power for operating the HMR.
Provides serial and USB ports for data communication between the HMR and a host computer or other serial devices (e.g., a printer).

When a HMR with Microsoft Mobile 5.0 is placed in the cradle and an ActiveSync connection is made, the WLAN radios are disabled. This is a Microsoft security feature to prevent connection to two networks at the same time.

Synchronizes information between the HMR and a host computer. (With customized or third party software, it can also be used to synchronize the HMR with corporate databases.)
Charges the HMR's main battery.
Charges a spare battery.

Setup

⚠ Use only a Symbol approved power supply output rated 12 VDC and minimum 3.3 A. Use of an alternative power supply will void the product warranty and may cause product damage.

The cradle requires a dedicated port on the host. Select either serial or USB for communications. Do not connect the cradle to both serial and USB ports.

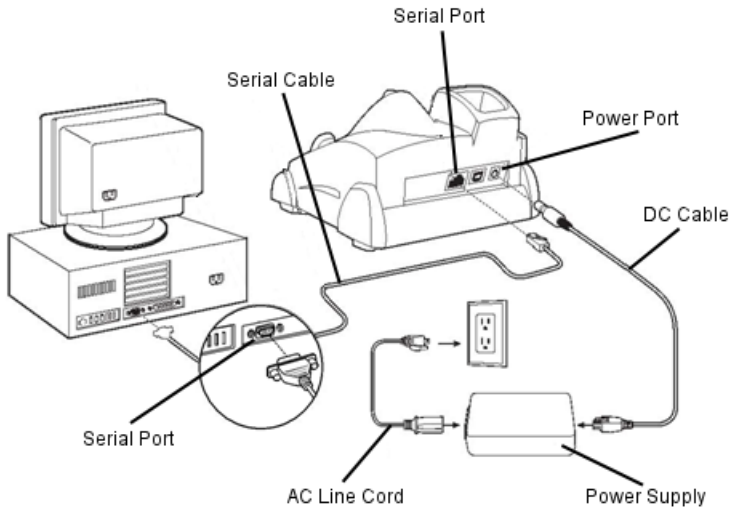


Figure 3-5 Single Slot Cradle Power/Serial Connections

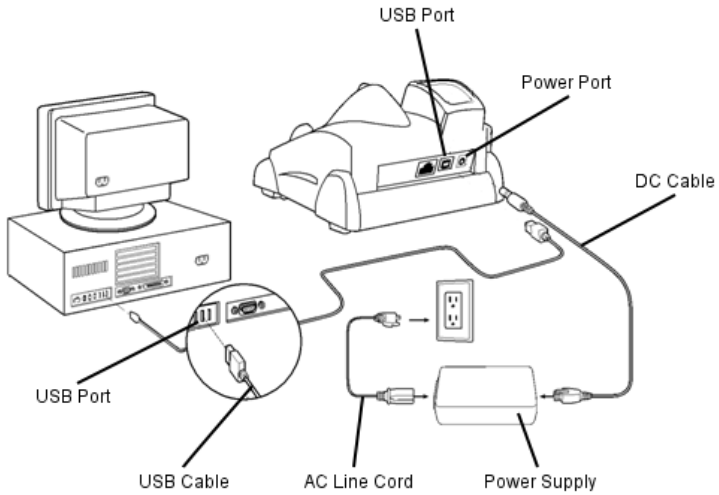


Figure 3-6 Single Slot Cradle Power/USB Connections

Battery Charging Indicators

The Single Slot Serial/USB Cradle can charge the HMR's main battery and a spare battery simultaneously. The HMR's amber charge LED, located in the Indicator LED Bar, shows the status of the battery charging in the HMR. See Table 2-2 on page 17 for charging status indications. The amber spare battery charging LED on the cradle (see Figure 3-4 on page 27) shows the status of the spare battery charging in the cradle. See Table 3-1 for charging status indications. Batteries usually charge in less than four hours.

Table 3-1 Spare Battery LED Charging Indicators

Spare Battery LED (on cradle)	Indication
Off	No spare battery in well; spare battery not placed correctly; cradle is not powered.
Fast Blinking Amber	Error in charging; check placement of spare battery.
Slow Blinking Amber	Spare battery is charging.
Solid Amber	Charging complete.

3.5 Four Slot Ethernet Cradle

⚠ Ensure that you follow the guidelines for battery safety described in Battery Safety Guidelines on page 186.

This section describes how to set up and use a Four Slot Ethernet cradle with the HMR. For cradle communication setup procedures see Ethernet Communication Setup on page 31.

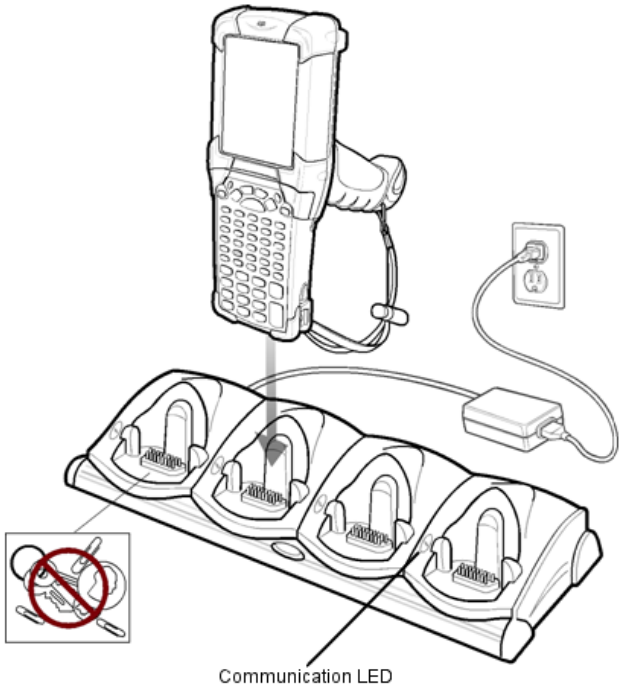


Figure 3-7 Four Slot Ethernet Cradle

⚠ Do not place coins, keys, or paper clips in cradle well.

The Four Slot Ethernet cradle:

- Provides 12VDC power for operating the HMR.
- Enables data communication between the HMR (up to four) and a host computer, over an Ethernet network (using a standard 10Base-T Ethernet cable).
- Synchronizes information between the HMR and a host computer. (With customized or third party software, it can also be used to synchronize the HMR with corporate databases.)
- Simultaneously charges up to four batteries in the HMR.

Table 3-2 Communication LED

Status	Indication
Off	HMR is not in cradle; HMR not placed correctly; cradle is not powered.
Solid Red	HMR is present, but communication has not started.
Flashing Green	HMR is in the cradle, and communicating with the host computer.
Slow Flashing Red	Error, communication did not start.
Fast Flashing Red	Warning: Terminal inactivity time-out. The terminal did not finish data synchronization or had an open connection for more than 15 minutes. This time is programmable in the cradle flash parameters.
Solid Green	Terminal is present in the slot and communication is complete.
ALL LEDs Flashing Red	Failed automatic cradle configuration via local DHCP Service.

Setup

⚠ Use only a Symbol approved power supply output rated 12 VDC and minimum 9 A. Use of an alternative power supply will void the product warranty and may cause product damage.

The Four Slot Ethernet cradle must be connected to a power source and to an Ethernet Hub (when applicable).

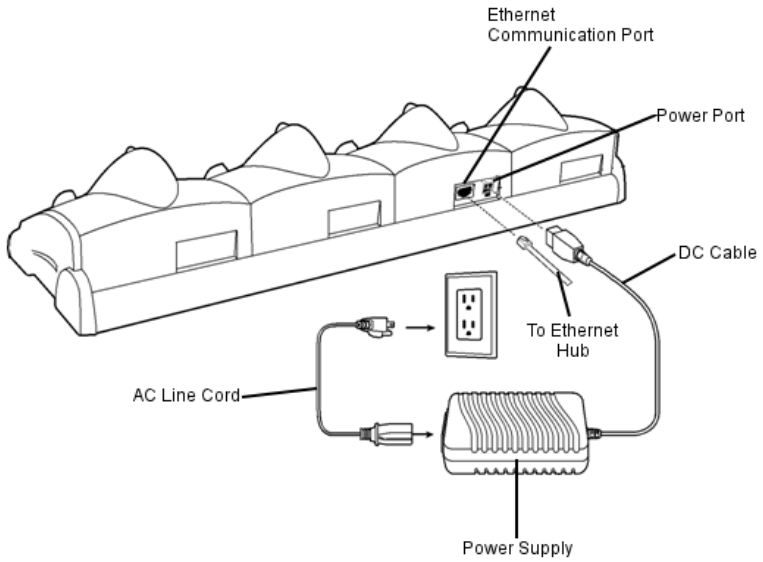


Figure 3-8 Four Slot Ethernet Cradle Power Connection

Battery Charging Indicators

The HMR's amber charge LED, located in the Indicator LED Bar, shows the status of the battery charging in the HMR. See Table 2-2 on page 17 for charging status indications. The battery usually charges in less than four hours.

Ethernet Communication Setup

To establish a connection between the HMR and the host computer to communicate over an Ethernet network, perform the following:

1. Install MobileDox Cradle Manager
2. Install iDockIt
3. Configure the HMR
4. Configure the host computer
5. Configure the DHCP server
6. Configure the cradle.

Installing MobileDox Cradle Manager

MobileDox Cradle Manager is used only when establishing a connection using the Four Slot Ethernet cradle.

The Cradle Management software features:

- View cradles that are attached to the network via MobileDox Net
- View cradle status
- Modify cradle settings including:
  - IP address settings
  - DNS and WINS settings
  - Identification settings
  - USB port specific settings
- Restart cradles connected to the network via MobileDox Net
- Update the firmware of MobileDox Net.

To install the Cradle Management Software on the host computer, download the latest version of the software from http://support.symbol.com. Refer to the instructions included with the software.

Installing iDockIt

iDockIt is a connection utility which manages activities between the HMR and a connected Ethernet cradle. For more information on the utility, see the documentation provided with *iDockIt*.

iDockIt features:

1. The ability to manage multiple cradle profiles. iDockIt auto-detects the cradle communication type and behaves accordingly.
2. Integrated modem capabilities using TAPI interface.
3. Runs as a tray application, and always runs in the background.
4. The ability to configure settings within the application.
5. Options to change parameters upon docking (with or without settings time-out).
6. The ability to force synchronization events.
7. The ability to disable WLAN connection on the device to ensure synchronization is performed via dock.
8. Management of multiple connection types without losing settings.

On HMRs with OEM version lower than 28, the *iDockIt* installation file to install *iDockIt* on the HMR can be downloaded from http://support.symbol.com to the host computer. Follow the instructions provided with the *iDockIt* software to install *iDockIt* onto the HMR.

On HMRs with OEM version 28 and higher, the *iDockIt* installation file is loaded on the HMR. To install *iDockIt*:

1. Open **File Explorer**.
2. Navigate to the **Application** directory.
3. Tap the file: IDOCKIT_4.02.05.2_MC90XX_WM5.cab

iDockIt installs on the HMR. Follow the onscreen instruction.

Refer to Appendix A, Using iDockIt for instructions on configuring and using iDockIt.

HMR Configuration

Inserting the HMR into the cradle provides direct-connect Remote Access Service (RAS) service. Configure each HMR for use with the cradle, just as any remote client would be configured to connect to an Internet Service Provider (ISP). The computer COM port setting was set to USB during the iDockIt installation procedure.

DHCP Server Configuration

If you use a DHCP server to distribute IP addresses and other network parameters, the server setup should include the following:

- IP address pool (1 or 5 IP address per cradle)
- Router/gateway address
- One or more DNS server addresses
- One or more WINS server addresses
- Subnet mask

To assign the initial cradle IP address, you can either use a DHCP server, as shown above, or use the MobileDox Cradle Manager (see ***Installing MobileDox Cradle Manager*** on page ***31***). The DHCP server is the preferred method.

Cradle Configuration

The MobileDox Cradle Manager allows you to setup the Device IP Address and modify cradle settings. See Installing MobileDox Cradle Manager on page 31 for instructions to download and install the software. See Figure 3-7 on page 29 for instructions on Four Slot Ethernet cradle connections.

Setting the Device IP Address

By default, the cradle uses DHCP to obtain its IP address. However, if DHCP fails, the Cradle Manager can assign an IP address.

This is used if the cradle is connected to the network, but fails to appear in MobileDox. Enter the hardware device (MAC) address to locate the cradle and assign it a new IP address.

To set the IP address:

1. Launch the MobileDox Cradle Manager on the host computer.
2. Click **File** > **Set IP Address of Unlisted Device**. The Set IP Address window appears:

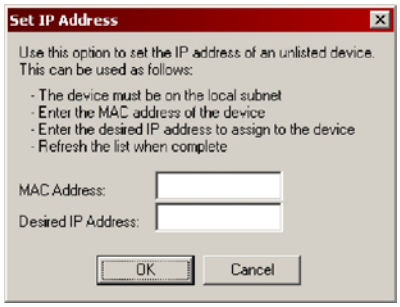


Figure 3-9 Set IP Address Window

3. Enter the appropriate MAC Address and IP address.
4. Click **OK**.

Modifying Cradle Settings

- Launch the MobileDox Cradle Manager on the host computer.
- Select the name of the cradle you want to configure from the list.
- Click **Device** > **Modify Settings**.
- Use the **General Settings** tab to modify the identification settings of the cradle.

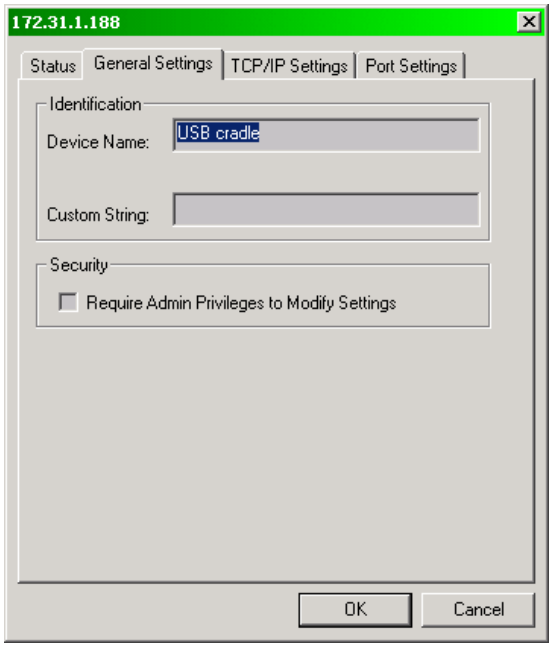


Figure 3-10 Cradle Settings Window – General Settings Tab

Table 3-3 Cradle Settings – General Settings Fields

Field	Description
Device Name	A text string used to describe the MobileDox device. Any 15-character string may be entered.
Custom String	A text string for any desired usage (examples are: location, asset ID, etc.). Any 15-character string may be entered.
Require Admin Privileges to Modify Settings check box	Selecting this check box requires users to have administrative privileges in order to modify MobileDox settings. Administrative privileges are validated using standard Windows authentication.

- Use the **TCP/IP Settings** tab to modify the DNS and WINS identification settings of the cradle.

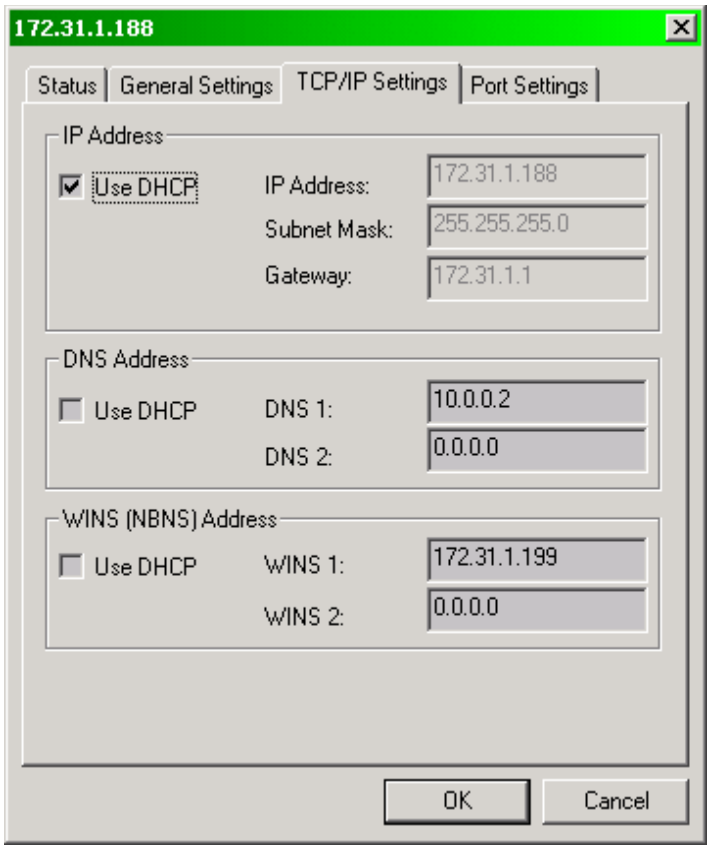


Figure 3-11 Cradle Settings Window – TCP/IP Settings Tab

Table 3-4 Cradle Settings – TCP/IP Settings Fields

Field	Description
Use DHCP	If check box is selected, necessary information is retrieved from the DHCP server. If check box is not selected, static configuration is used (information needs to be entered).
IP Address	The IP address that MobileDox uses when communicating on the network.
Subnet Mask	The subnet mask that MobileDox uses when communicating on the network.
Gateway Address	The IP address that MobileDox uses to send non-local IP network data.
DNS Address	The IP address of a server(s) that can resolve Internet names into IP addresses.
WINS Address	The IP address of a server(s) that can resolve Windows network names into IP addresses. This field must be populated correctly when using ActiveSync.

- Use the **Port Settings** tab to modify the USB port settings of the cradle.

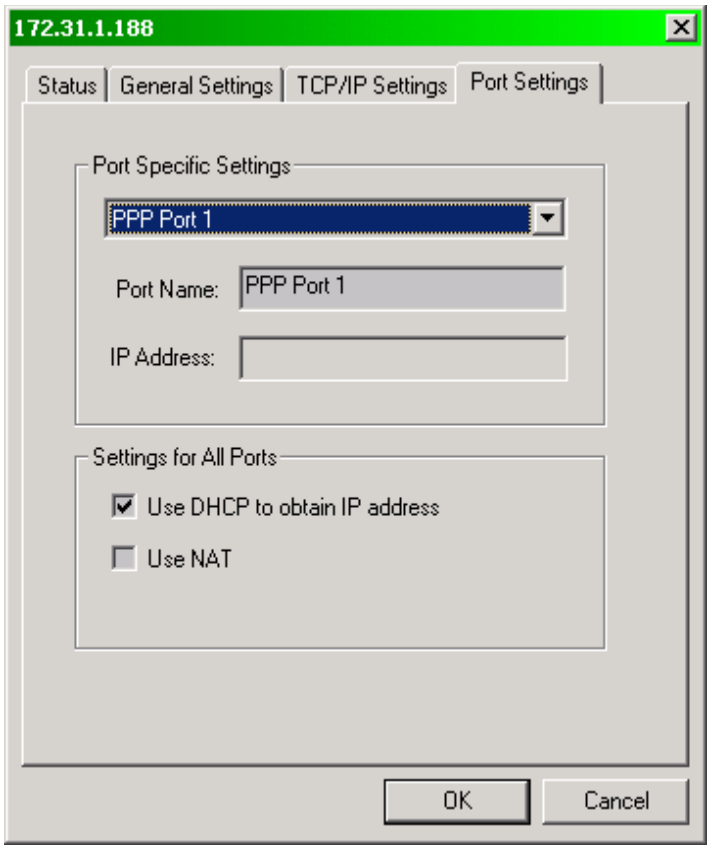


Figure 3-12 Cradle Settings Window – Port Settings Tab

Table 3-5 Cradle Settings – Port Settings Fields

Field	Description
Port Name	A text string used to describe the device attached to the port. Any 15-character string can be entered. You can specify up to four port names, one for each of the cradle's slots.
IP Address	The IP address assigned to the cradled device. There should be one IP address per cradle slot. This box is disabled for all devices if DHCP is used to obtain the IP address.
Use DHCP to obtain IP Address check box	The cradle uses DHCP to obtain an IP address for the handheld. Unchecking this selection allows the cradle to use Static IP address for the handheld.
Use NAT check box	The cradle uses Network Address Translation (NAT) when forwarding handheld traffic onto the network. No IP addresses are necessary for the handhelds. This must be disabled when using ActiveSync.

- Click **OK**.

3.6 Four Slot Charge Only Cradle

⚠ Ensure that you follow the guidelines for battery safety described in Battery Safety Guidelines on page 186.

This section describes how to set up and use a Four Slot Charge Only cradle with the HMR.

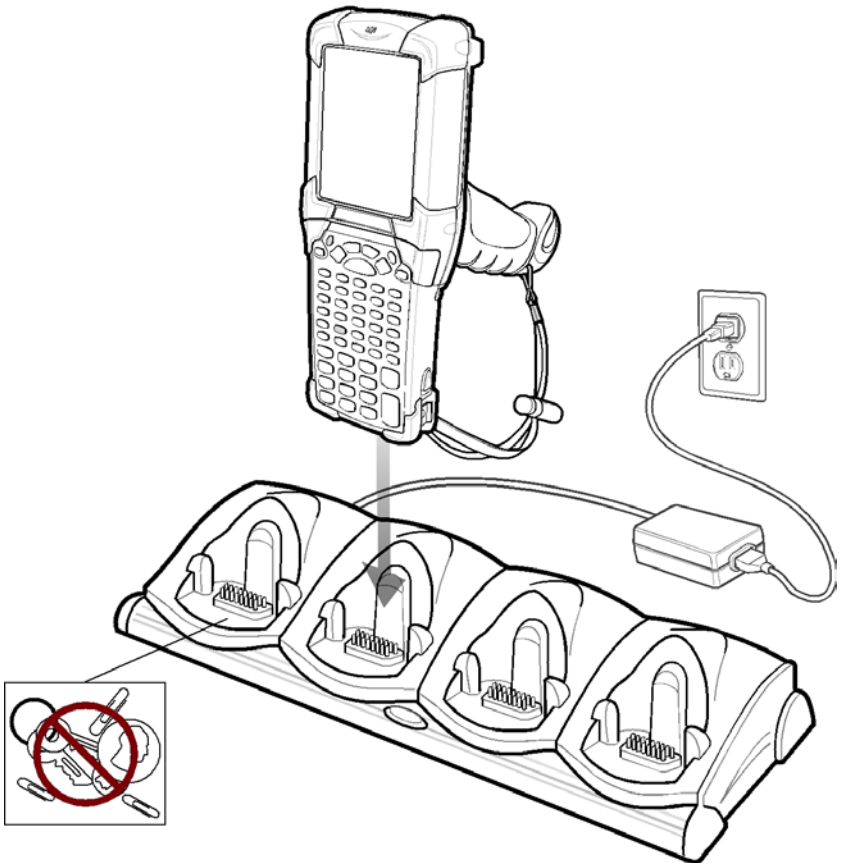


Figure 3-13 Four Slot Charge Only Cradle

⚠ Do not place coins, keys, or paper clips in cradle well.

The Four Slot Charge Only cradle:

- Provides 12VDC power for operating the HMR.
- Simultaneously charges up to four batteries in the HMR.

Setup

⚠ Use only a Symbol approved power supply output rated 12 VDC and minimum 9 A. Use of an alternative power supply will void the product warranty and may cause product damage.

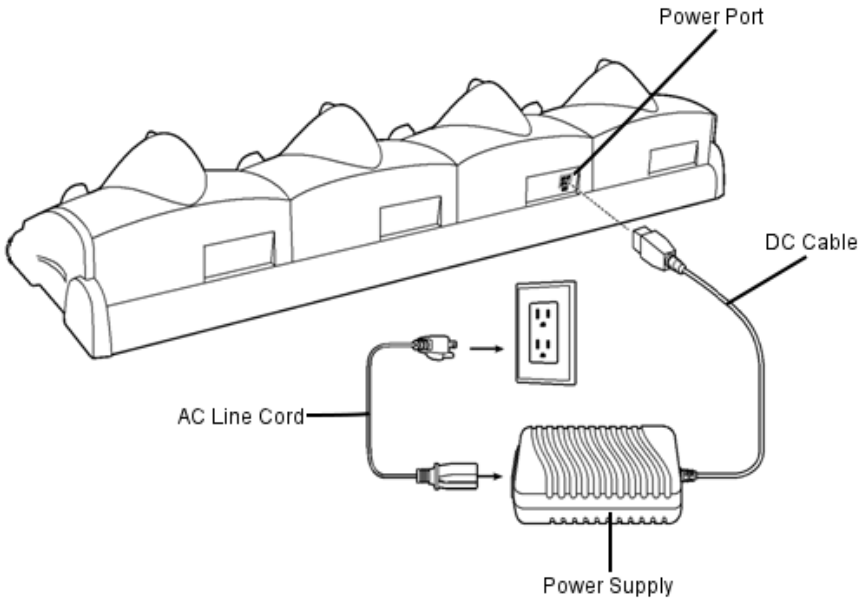


Figure 3-14 Four Slot Charge Only Cradle Power Connection

Battery Charging Indicators

The HMR's amber charge LED, located in the Indicator LED Bar, shows the status of the battery charging in the HMR. See Table 2-2 on page 17 for charging status indications. The battery usually charges in less than four hours.

3.7 Four Slot Spare Battery Charger

⚠ Ensure that you follow the guidelines for battery safety described in Battery Safety Guidelines on page 186.

This section describes how to set up and use the Four Slot Spare Battery Charger to charge up to four spare batteries.

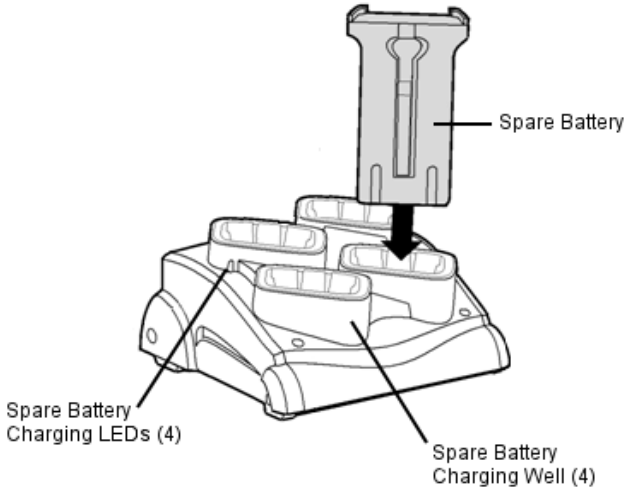


Figure 3-15 Four Slot Spare Battery Charger

Setup

⚠ Use only a Symbol approved power supply output rated 15 VDC and minimum 5 A. Use of an alternative power supply will void the product warranty and may cause product damage.

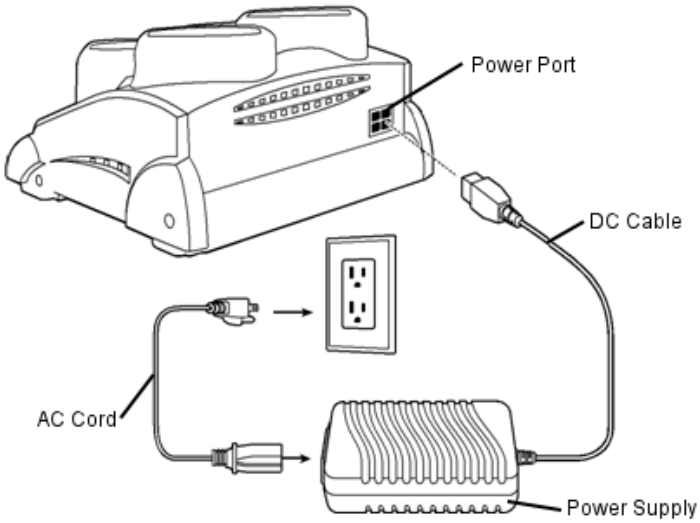


Figure 3-16 Four Slot Spare Battery Charger Power Connection

Spare Battery Charging with the Four Slot Spare Battery Charger

1. Connect the charger to a power source as shown in Figure 3-16.
2. Insert the battery into a spare battery charging slot and gently press down on the battery to ensure proper contact.

Battery Charging Indicators

An amber LED is provided on each battery charging well (see Figure 3-15 on page 37). See Table 3-6 on page 38 for charging status indicators.

The battery usually charges in less than four hours.

Table 3-6 Spare Battery LED Charging Indicators

LED	Indication
Off	No spare battery in slot; spare battery not placed correctly; cradle is not powered.
Fast Blinking Amber	Error in charging; check placement of spare battery.
Slow Blinking Amber	Spare battery is charging.
Solid Amber	Charging complete.

3.8 Magnetic Stripe Reader

This section describes how to set up and use the snap-on MSR with the HMR. The MSR snaps on to the bottom of the HMR and can be easily removed when not in use.

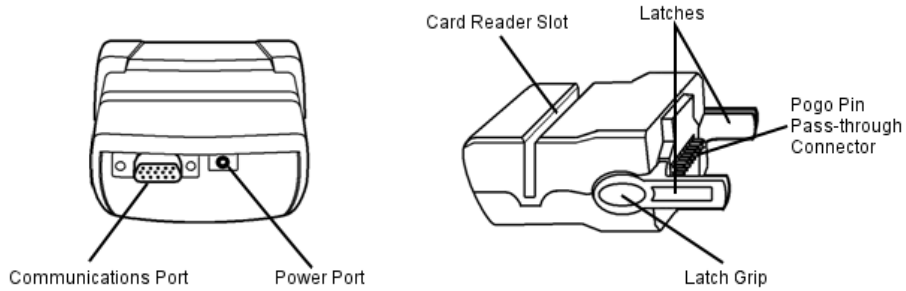


Figure 3-17 Magnetic Stripe Reader

When attached to the HMR, the MSR:

- Provides power for operating the HMR, with the appropriate power connection.
- Allows the HMR to capture data from magnetic stripe cards. (To download MSR data capture software, visit: http://support.symbol.com.)

When a HMR is connected to a host computer through the MSR and an ActiveSync connection is made, the WLAN radio is disabled. This is a Microsoft security feature to prevent connection to two networks at the same time.

- Provides serial connection through the serial pass-through port for communication with a serial device, such as a host computer. For communication setup procedures, see Serial Communication Setup on page 56.
- Provides USB connection through the USB pass-through port for communication with a USB device, such as a host computer. For communication setup procedures, see Serial Communication Setup on page 58.
- Charges the HMR's battery, when used with the appropriate power supply.

Attaching and Removing

To attach, snap the MSR onto the bottom of the HMR.

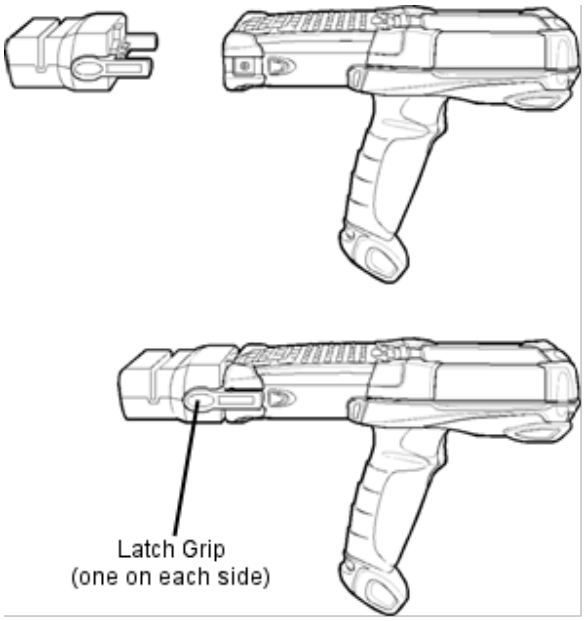


Figure 3-18 Attaching the MSR

To remove, squeeze the latch grips and pull the MSR from the HMR.

Remove the MSR from the bottom of the HMR before using a cradle for charging and communication.

Setup

Use only a Symbol approved power supply rated 12 VDC and minimum 3.3 A. Use of an alternative power supply will void the product warranty and may cause product damage.

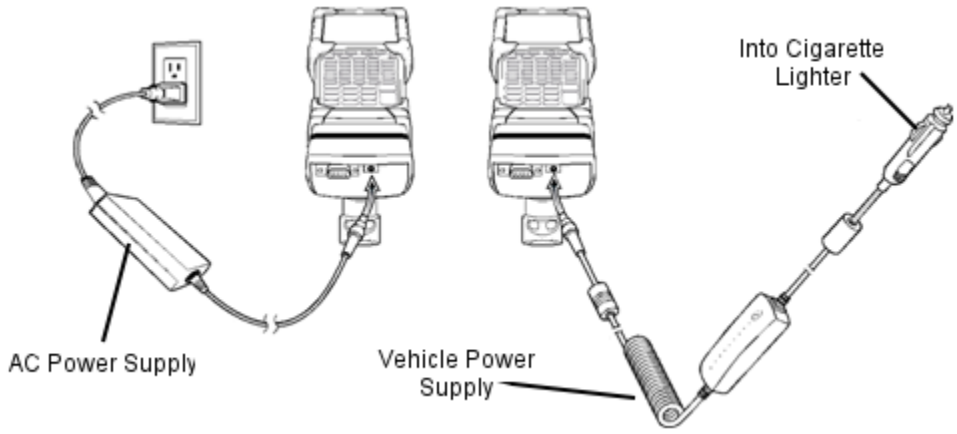


Figure 3-19 MSR Power Connection

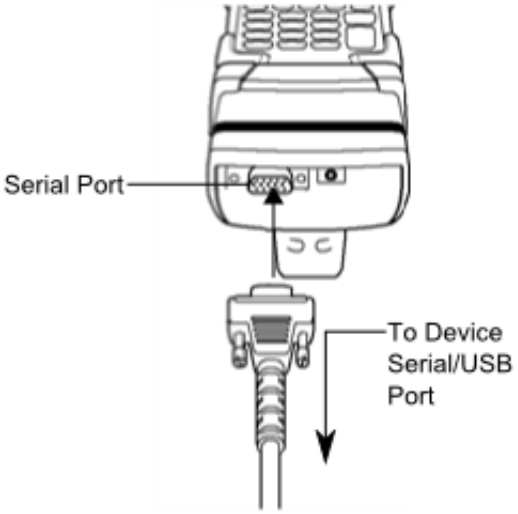


Figure 3-20 MSR Serial/USB Connection

Battery Charging Indicators

To charge the HMR's battery through the MSR, connect the power supply to the MSR (see Figure 3-19 on page 40), then attach the MSR to the HMR. The HMR begins charging automatically.

Batteries must be charged within the 32° to 104° F (0° to +40° C) ambient temperature range.

The HMR's amber charge LED, located in the Indicator LED Bar, shows the status of the battery charging in the HMR. See Table 2-2 on page 17 for charging status indications.

The battery usually charges in less than four hours, if the HMR is not in use.

Serial/USB Connection

The MSR can connect to and communicate with a serial/USB device, such as a printer or host computer, through its serial port. See Serial Communication Setup on page 56 for the host computer communication setup procedure.

To connect the MSR to a serial/USB device, connect one end of the serial device cable into the serial port on the MSR and the other end into the serial/USB port on the device.

Using the MSR

The *MSR9000* sample application is designed to work with the MSR. This sample application illustrates how an application should handle MSR inputs (refer to the *Symbol Application Guide for Symbol Devices*).

The MSR does not need to be attached to the power supply to read magnetic stripes.

To use the MSR:

- Attach the MSR to the HMR (see Attaching and Removing on page 39).
- Power on the HMR.
- Tap **Start** > **9000 Demo** > **Test Apps** > **MSR 9000** or **MSR Cameo** to start the sample application.
- Swipe the magnetic stripe card through the MSR, ensuring the magnetic stripe on the card faces the HMR. The card may be swiped in either direction, from left to right or from right to left. For best results, gently press down on the card while swiping to ensure contact with the bottom of the reader.

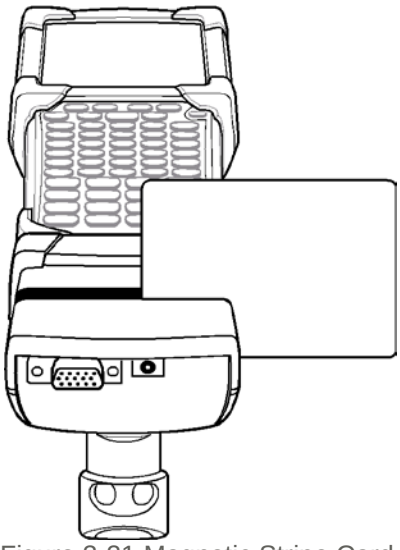


Figure 3-21 Magnetic Stripe Card Swiping

3.9 Cable Adapter Module

This section describes how to set up and use the snap-on CAM with the HMR. The CAM snaps on to the bottom of the HMR and can be easily removed when not in use.

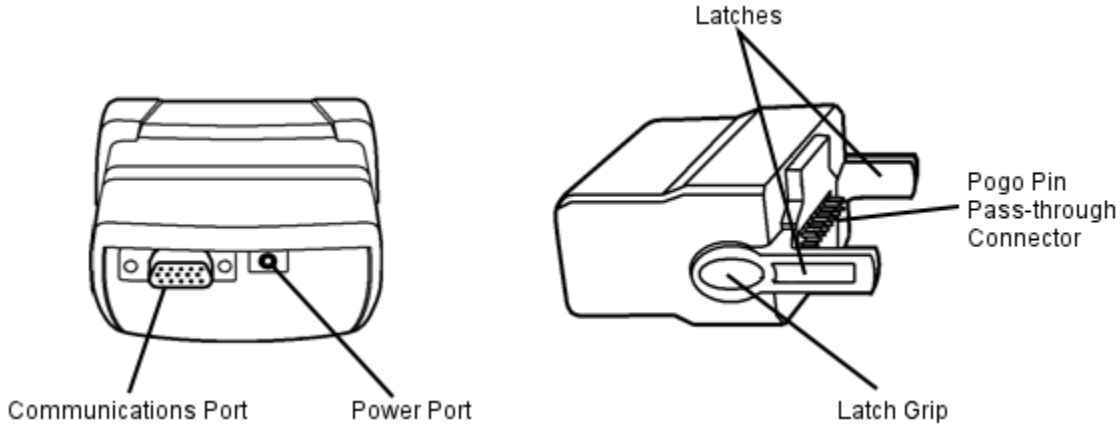


Figure 3-22 Cable Adapter Module

When attached to the HMR, the CAM:

1. Provides power for operating the HMR, with the appropriate power connection.

When a HMR is connected to a host computer through the CAM and an ActiveSync connection is made, the WLAN radio is disabled. This is a Microsoft security feature to prevent connection to two networks at the same time.

2. Provides serial connection through the serial pass-through port for communication with a serial device, such as a host computer. For communication setup procedures, see Serial Communication Setup on page 56.
3. Provides USB connection through the USB pass-through port for communication with a USB device, such as a host computer. For communication procedures, see USB Host Communication Setup on page 58.
4. Charges the HMR's battery, when used with the appropriate power supply.

Attaching and Removing

To attach, snap the CAM onto the bottom of the HMR.

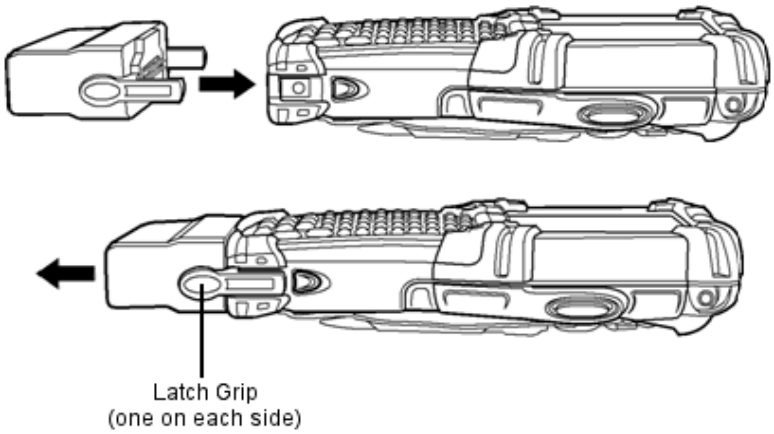


Figure 3-23 Attaching the CAM

To remove, squeeze the latch grips and pull the CAM from the HMR.

Remove the CAM from the bottom of the HMR before using a cradle for charging and communication.

Setup

Use only a Symbol approved power supply output rated 12 VDC and minimum 3.3 A. Use of an alternative power supply will void the product warranty and may cause product damage.

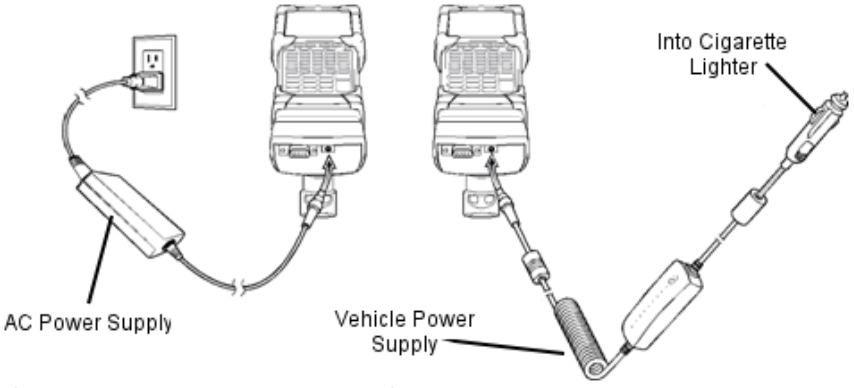


Figure 3-24 CAM Power Connection

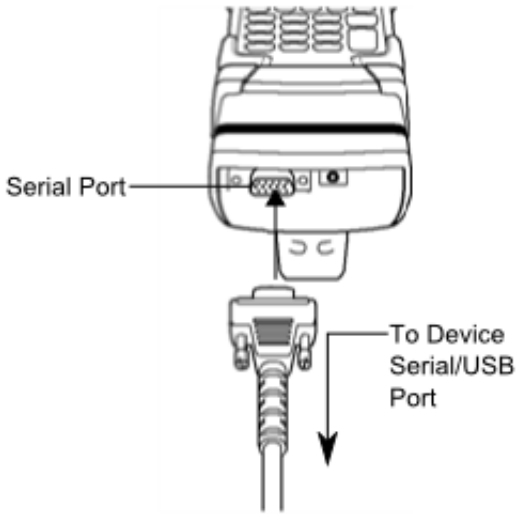


Figure 3-25 CAM Serial Connection

Battery Charging Indicators

To charge the HMR's battery through the CAM, connect the power supply to the CAM. (see Figure 3-24 on page 42), then attach the CAM to the HMR. The HMR begins charging automatically.

Batteries must be charged within the 32°F to 104°F (0°C to 40°C) ambient temperature range.

The HMR's amber charge LED, located in the Indicator LED Bar, shows the status of the battery charging in the HMR. See Table 2-2 on page 17 for charging status indications. The battery usually charges in less than four hours, if the HMR is not in use.

Serial/USB Connection

The CAM can connect to and communicate with a serial/USB device, such as a printer or host computer, through its serial port. See Serial Communication Setup on page 56 for the host computer communication setup procedure.

To connect the CAM to a serial/USB device, connect on end of the serial device cable into the serial port on the CAM and the other end into the serial/USB port on the device.

3.10 Universal Battery Charger (UBC) Adapter

⚠ Ensure that you follow the guidelines for battery safety described in Battery Safety Guidelines on page 186.

This section describes how to use the UBC adapter to charge a spare battery.

The UBC can be used with a power supply as a standalone spare battery charger or it can be used with the four station UBC2000 to provide charging to simultaneously charge up to four spare batteries. For additional information about the UBC2000, see the *UBC 2000 Universal Battery Charger Product Guide* (p/n 70-33188-01).

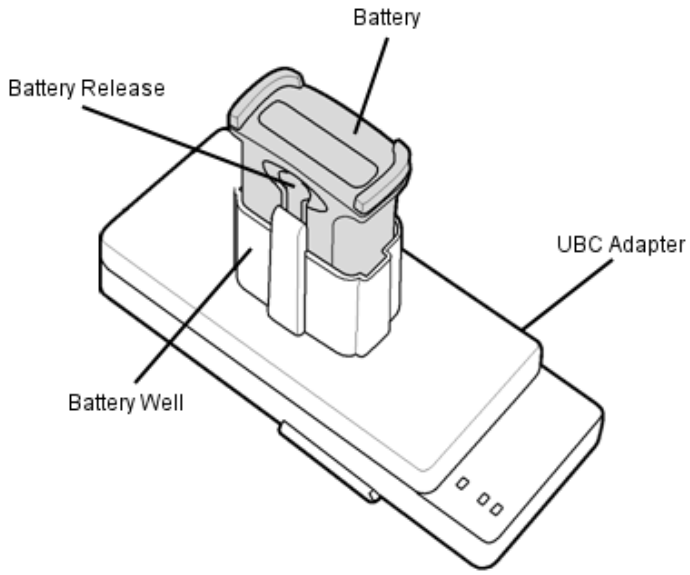


Figure 3-26 UBC Adapter

Inserting and Removing a Battery

Insert the battery into the battery well with the charging contacts facing down (over charging pins) and gently press down on the battery to ensure proper contact.

To remove the battery, press the battery release and lift the battery out of the well.

Setup

⚠ Use only a Symbol approved power supply output rated 15 VDC and minimum 1.5 A. Use of an alternative power supply will void the product warranty and may cause product damage.

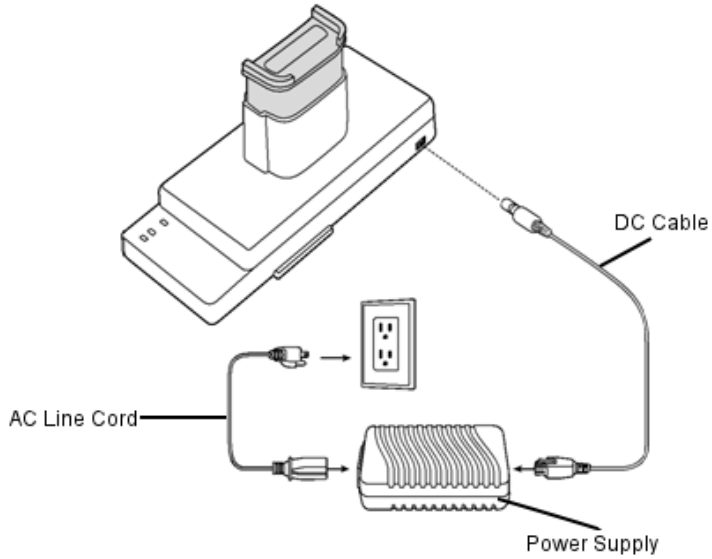


Figure 3-27 UBC Adapter Power Connection

Battery Charging Indicators

To charge a spare battery using the UBC adapter, connect the power supply to the UBC (see Figure 3-27 on page 44), then insert the spare battery. The spare battery begins charging automatically. The UBC's charge LEDs (see Figure 3-28) show the status on

the battery charging in the adapter. Table 3-7 shows battery charging status indications. The battery usually charges in three hours.

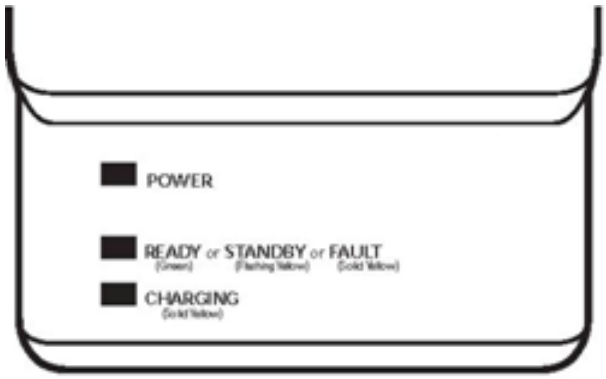


Figure 3-28 UBC Adapter LEDs

Table 3-7 UBC Adapter Charge LED Status Indications

LED	Indication	Description
POWER	Green	Power is connected to the UBC Adapter.
READY or	Green	Charging complete.
STANDBY	Flashing-	The battery was deeply discharged and is being trickle
or	Yellow	charged to bring the voltage up to the operating level. After operating level voltage is achieved the battery charges normally.
FAULT	Yellow	Charging error, check placement of HMR/spare battery.
CHARGING	Yellow	Normal charge.

3.11 Modem Module

This section describes how to use the MDM9000 Modem Module.

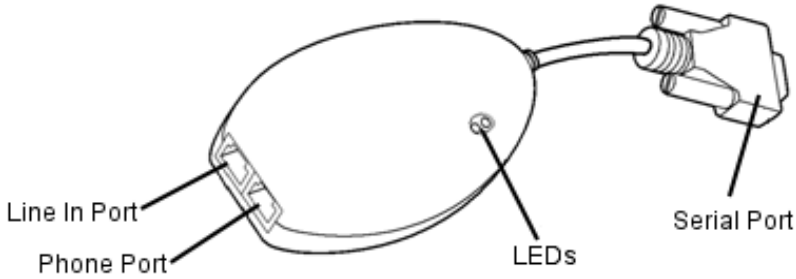


Figure 3-29 Modem Module

The Modem Module enables data communication between the HMR and a host computer, remotely through the phone lines, and synchronizes information between the HMR and a host computer.

The following items are required for a modem connection:

1. Telephone number, IP address and DNS/WINS address information from the dial-in server administrator
2. Dial-in account on the host system, including a user ID and password
3. RJ11 or RJ12 modem cable
4. Functioning telephone jack that supports plug-in modems connected to the local telephone

The following items are required for communication:

1. HMR
2. Cable Adapter Module (CAM), Symbol p/n ADP9000-100 (see Cable Adapter Module on page 41)
3. Serial Adapter Cable (for communication via cradle), Symbol p/n 25-63856-01
4. Microsoft ActiveSync

Setup

Connecting to the HMR

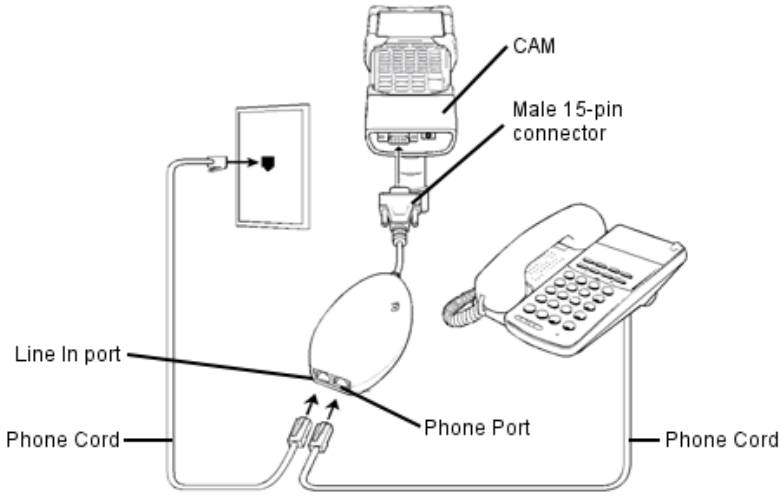


Figure 3-30 Modem Module Connection – HMR

⚠ Do not connect the modem's 15-pin connector into a VGA port of a host computer.

Using the Correct Telephone Line Type

Use a standard analog phone line, as in most households. In an office, use a line connected to a fax machine or modem. In a hotel, request a room with a standard phone line or data port. If necessary, check with the local phone company or administrator to make sure you are using the right type of line before sending data.

Connecting to the Single Slot Serial/USB Cradle

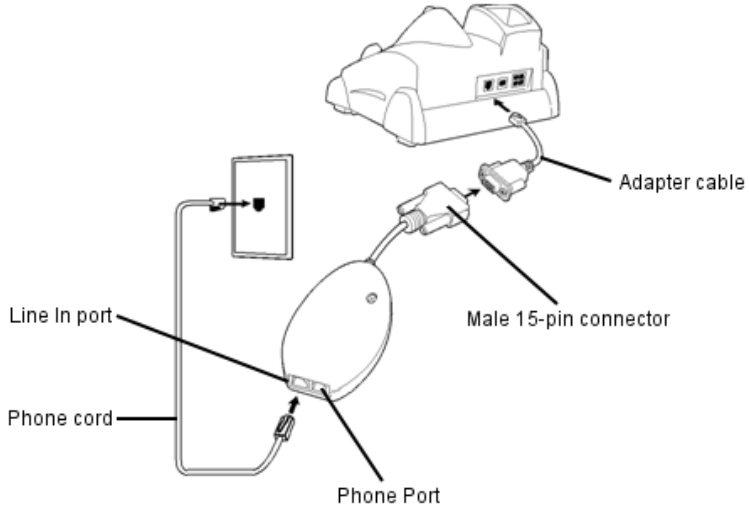


Figure 3-31 Modem Module Connection – Single Slot Serial/USB Cradle

⚠ Do not connect the modem's 15-pin connector into a VGA port of a host computer

If using a phone, connect the cord from the phone to the Phone port on the modem.

Table 3-8 Modem Indicators

LED	Indication
Off	Modem is not properly connected to the HMR; modem is not receiving power.
Green	Modem is connected to the HMR and is receiving power.
Solid Amber	HMR is communicating with the host computer.

Configuring the HMR for the Modem

To edit an existing modem connection using Manage existing connections, see **Changing the Initialization String** on page **50**.

To create a new modem connection on the HMR:

- Connect the modem to the HMR as described in Connecting to the HMR on page 46.
- Tap **Start** > **Settings** > **Connections** tab > **Connections** icon.
- In the **Connections** window, select **Add a new modem connection** to create a connection.

Figure 3-32 Connections Window

- Enter a name for the connection. In the drop-down menu, select **Hayes Compatible on COM1**, and then tap **Next**.

Figure 3-33 New Connection Window

- Enter the access phone number in the **My Connection** window and tap **Next**.

Figure 3-34 My Connection Window – Phone Number

Depending on the location when dialing, additional numbers may need to be dialed (e.g., a 9 prefix is often required if dialing from work; a country code is needed if dialing internationally). To avoid creating new modem connections for each situation, tap use dialing rules to define frequently used dialing locations.

- If necessary, enter the user name, password and domain.

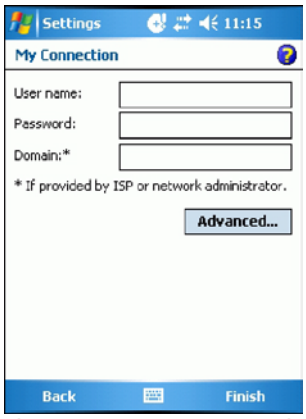


Figure 3-35 My Connection Window – User Information Settings

- Tap **Advanced...** to edit the **Extra dial-string modem commands:** text box to set country parameters to operate the modem with other country telephone networks.
  The modem defaults to operating with US telephone networks (country code: B5). To operate the modem with other country telephone networks, a country code must be entered. The modem adjusts its operating parameters to comply with the telephone network in the country specified. See Modem Country Setup on page 50 for the appropriate syntax and a list of country codes.

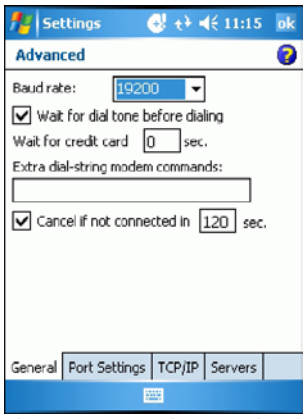


Figure 3-36 Advanced Window – Extra Dial-String Modem Commands

- Tap **ok** to exit the **Advanced** window.
- Tap **Finish**.

Connecting the Modem

To start the connection:

- Tap **Start** > **Settings** > **Connections** tab > **Connections**.
- In the **Connections** window, tap **Manage existing connections**.

Figure 3-37 My Connections Window

- Tap and hold the connection name, then select **Connect** from the menu that appears. The modem attempts to connect.

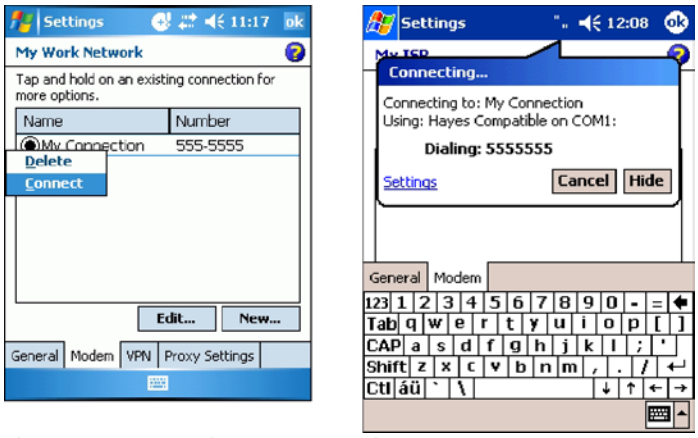


Figure 3-38 Creating a Connection

Modem Country Setup

Edit the *Extra dial-string modem commands*: text box in the HMR to set country parameters. The syntax used is: +GCI=<country_code>.

Supported Countries

Table 3-9 Supported Countries

Country	Code
Australia	09
Austria	FD or 0A
Belgium	FD or 0F
Brazil	16
Canada	20
Denmark	FD or 31
Finland	FD or 3C
France	FD or 3D
Germany	FD or 42
Greece	FD or 46
Iceland	FD
Ireland	FD or 57
Italy	FD or 59
Liechtenstein	FD
Luxembourg	FD
Mexico	73
Netherlands	FD or 7B
New Zealand	7E
Norway	FD or 82
Portugal	FD or 8B
Spain	FD or A0
Sweden	FD or A5
Switzerland	FD or A6
TBR-21 (Europe)	FD
United Kingdom	FD or B4
United States	B5 (Default)

Use FD where possible. If connection problems occur, use the alternate code where provided.

AT Commands

The AT Command Set allows you to custom-configure the modem.

Only experienced users having difficulty with default settings should use this feature.

Changing the Initialization String

To enter AT commands:

1. Tap **Start** > **Settings** > **Connections** tab > **Connections** icon.
2. If creating a new connection, select **Add a new modem connection** in the **Connections** window. Then follow steps 1 through 6 in Configuring the HMR for the Modem on page 47 and proceed to step 6.

Figure 3-39 Connections Window

3. If entering AT commands for an existing connection, select **Manage existing connections** in the **Connections** window.
4. On the **Modem** tab, select the radio button of the item to edit and tap **Edit…**

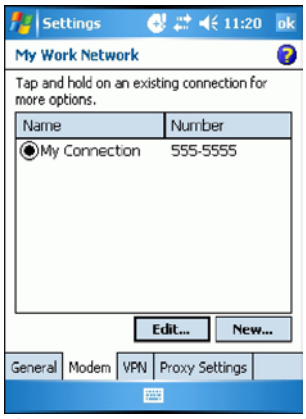


Figure 3-40 New Connection Window

5. Tap **Next** until the **User Information Settings** window appears.
6. Tap Advanced…

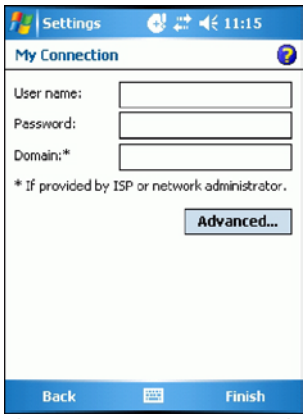


Figure 3-41 My Connection Window – User Information Settings

7. Enter AT commands in the **Extra dial-string modem commands:** text box. See Basic AT Command Syntax on page 52.

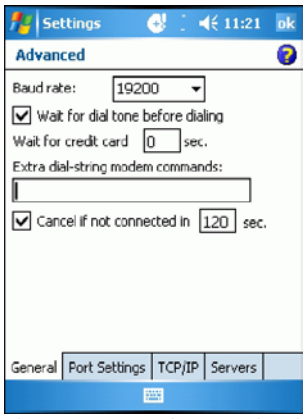


Figure 3-42 Advanced Window – Extra Dial-String Modem Commands

8. Tap **ok** to exit the *Advanced* window.
9. Tap **Finish**.

Basic AT Command Syntax

A command line is made up of three elements:

1. **Prefix** - consists of the characters “AT” or “at” or, to repeat the execution of the previous command line, “A/” or “a/”.
2. **Body** - made up of individual commands described later. Space characters (IA5 2/0) are ignored and may be used for formatting purposes, unless they are embedded in numeric or string constants. The termination character may not appear in the body. The modem can accept at least 40 characters in the body.
3. **Termination character** - may be selected by a user option (parameter S3). The default is CR.

The format of Basic Syntax commands, except for the D and S commands, is as follows:

<command>[<number>]

where:

1. <command> is either a single character, or the “&” character followed by a single character per V.250; or the “%” character followed by a single character, the “*” character followed by a single character, or the “^” character followed by a single character.
2. <number> is a string of one or more characters from “0” through “9” representing a decimal integer value. Commands expecting a <number> are noted in the description of the command. If <number> is missing from such a command (<command> is immediately followed by another <command> or the termination character), the value “0” is assumed. If a command does not expect a <number> and a number is present, an error occurs. All leading “0”s in <number> are ignored by the modem.

Additional commands may follow a command (and associated parameter, if any) on the same command line with a separation character. The actions of some commands cause the rest of the command line to be ignored.

S-Parameters

Commands that begin with the letter “S” are known as “S-parameters”. The number following the “S” indicates the “parameter number” referenced. If the number is not recognized as a valid parameter number, an ERROR result code issues. Immediately

following this number, either a “?” or “=” character must appear. “?” is used to read the current value of the indicated S-parameter; “=” sets the S-parameter to a new value.

S<parameter_number>?

S<parameter_number>=[<value>]

If the “=” is used, the new value to be stored in the S -parameter is specified in decimal following the “=”. If no value is given (i.e., the end of the command line occurs or the next command follows immediately), the S-parameter specified may be set to 0, or an ERROR result code issues and the stored value remains. The ranges of acceptable values are given in the description of each S-parameter.

If the “?” is used, the modem transmits a single line of information text to the DTE. The text portion of this information text consists of exactly three characters, giving the value of the S-parameter in decimal, with leading zeroes included.

Commands

The tables that follow summarize the AT commands, result codes, and S-Registers for the MDM 3000. **<string>** represents a letter, number, or symbol to be entered. **<value>** represents a number to be entered. Possible values are listed below the command.

Table 3-10 AT Command Table

Command	Description		Country Specific
D	Dial “D<string>”		
	0-9	DTMF digits 0-9	
	*	The ‘star’ digit (tone dialing only)	
	#	The ‘gate’ digit (tone dialing only)	
	A-D	DTMF digits A,B,C,D	X
	L	Re-dial last number	
	P	Pulse dialing	X
	T	Tone dialing	
	W	Wait for dial tone. (Modem waits for dial tone before dialing digits following “W”.)	
	@	Wait for silence. (Modem waits for at least 5 seconds of silence in the call progress frequency band before continuing with next dial string parameter.)	
	&	Wait for credit card dialing tone before continuing with the dial string.	
	‘	Dial pause. (Modem pauses for a time specified by S8 before dialing the digits following “,”.)	
	;	Return to command state. (Modem goes off hook and allows entering additional AT commands. Use “H” to go back to on hook.)	
	() - <space>	Ignored. (Might be used to format the dial string.)	
A	Off-hook and attempt to answer a call		
H	Disconnect – Hang UP		
O	Return to On-Line Data Mode. O <value>		
	0	Enters on-line data mode without a retrain.	
	1	Enters on-line data mode with a retrain.	
L	Speaker volume (Not used)		
M	Speaker control. M <value>		
	0	Always off.	
	1	On during call establishment. Off when receiving carrier. (default)	
	2	Always on.	
	3	Off when receiving carrier and during dialing. On during answering.	
&G	Guard tone. &G<value>		X
	0	Disables guard tone. (default)	
	1	Disables guard tone.	
	2	Select 1800 Hz guard tone.	
&V1	Displays last connection statistics		
+MS	Modulation Selection. +MS=<carrier>		X
	B103	Bell 103 (300)	
	B212	Bell 212 (1200 Rx/75 or 75Rx/1200 Tx)	
	V21	300	
	V22	1200	
	V22B	2400 or 1200	
	V23C	1200	
	V32	9600 or 4800	

Command	Description	Country Specific
	V32B 14400, 12000, 9600, 7200 or 4800 V34 33600, 31200, 28800, 26400, 2400, 21600, 19200, 16800, 14400, 12000, 9600, 7200, 4800 or 2400	
%E	Enable/Disable Line Quality Monitor and Auto-Retrain or Fall back/Fall forward. %E<value> 0 Disable line quality monitor and auto re-train. 1 Enable line quality monitor and auto re-train. 2 Enable line quality monitor and fallback/fall forward. (default).	
B	CCITT or Bell. B<value> 0 Select CCITT operation at 300 or 1200 bauds. 1 Selects Bell operation at 300 or 1200 bauds.	
&L	Leased Line Operation. &L<value> 0 Requests dial-up operation. Dial-up operation continues.	

Table 3-11 S-Register Settings

Reg	Function	Range	Default	Saved	Units
			Default		
S0	Rings to Auto Answer	0-255	0	*	Rings
S1	Ring Counter	0-255	0	*	Rings
S2	Escape Character	0-255	43		ASCII
S3	Carriage Return Character	0-127	13		ASCII
S4	Line Feed Character	0-127	10		ASCII
S5	Backspace Character	0-255	8		ASCII
S6	Wait Time before Blind Dialing or Dial Tone	2-255	2	*	S
S7	Wait Time for Carrier, Silence or Dial Tone	1-255	50	*	S
S8	Pause Time for Dial Delay Modifier	0-255	2	*	S
S9	Carrier Detect Response Time	1-255	6	*	0.1 S
S10	Lost Carrier to Hangup Delay	1-255	14	*	0.1 S
S11	DTMF Tone Duration	50-255	95	*	mS
S12	Escape Prompt Delay (EPD)	0-255	50	*	.02 S
S14	General Bit Mapped Options Status		138 (8Ah)		
S16	Test Mode Bit Mapped Options Status		0		
S19	Reserved		0		
S20	Reserved		0		
S21	V.24 Bit Mapped Options Status		52 (34h)		
S22	Speaker/Results Bit Mapped Options		117 (75h)		
S23	General Bit Mapped Options Status		62 (3Dh)		

S24	Sleep Inactivity Timer	0-255	0	S
S25	Delay to DTR off	0-255	5	S
S26	RTS-to-CTS Delay	0-255	1	.01 S
S27	General Bit Mapped Options Status		73 (49h)	
S28	General Bit Mapped Options Status		0	
S29	Flash Dial Modifier Time	0-255	70	10 mS
S30	Disconnect Inactivity Timer	0-255	0	10 S
S31	General Bit Mapped Options Status		195 (C0h)	
S36	LAPM Failure Control		7 *	
S38	Delay Before Forced Hangup	0-255	20	S
S39	Flow Control Bit Mapped Options Status		3	
S40	General Bit Mapped Options Status		104 (68h) *	
S41	General Bit Mapped Options Status		195 (C3h) *	
S46	Data Compression Control		138 *	
S48	V.42 Negotiation Control		7	
S86	Call Failure Indication	0-26	0	
S91	PSTN Transmit Attenuation Level	0-15	10**	
S92	Fax Transmit Attenuation Level	0-15	10**	dBm
S95	Extended Result Codes Control		0 *	dBm
S210	V.34 Symbol Rate	0-255	13 (0Dh)	

* Register value may be stored
** Country-dependent

3.12 Serial Communication Setup

The serial communications setup can be used to set up to communicate with a Single Slot Serial/USB Cradle, MSR or a CAM.

For serial communication using accessories that can communicate with either a serial or USB connection, connect only the serial cable. Do not connect both the serial and USB cables. If both serial and USB communication cables are required, the host computer's USB port must be disabled in ActiveSync before serial communication can be enabled.

Setting Up a Connection on the HMR

1. On the HMR tap **Start** > **Programs** > **ActiveSync** to display the **ActiveSync** window.

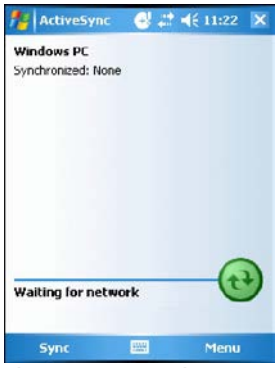


Figure 3-43 ActiveSync Window

2. Tap **Menu** > **Connections**. The **Connections** window appears.

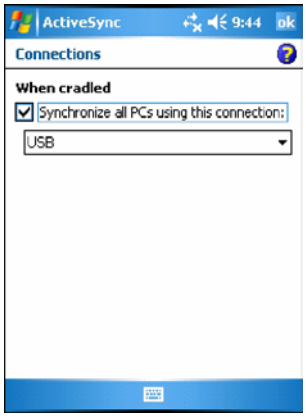


Figure 3-44 Connections Window

3. Select the *Synchronize all PCs using this connection:* check box.
4. Select the connection (e.g., serial COM port, Bluetooth, or USB) for synchronization from the drop-down list. The default connection for synchronization is USB.
5. Tap **ok** to exit the **Connections** window.
6. Ensure that ActiveSync is installed on the host computer and a partnership was created.
7. Select **Start** > **Programs** > **Microsoft ActiveSync** on the host computer, if it is not already running. The **Microsoft ActiveSync** window appears.

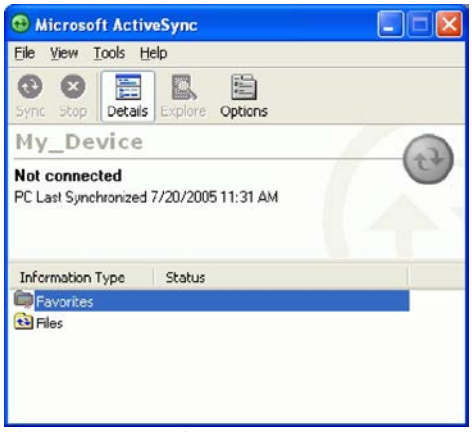


Figure 3-45 ActiveSync – Not Connected

Every HMR should have a unique device name. Never try to synchronize more than one HMR to the same name.

8. In the *ActiveSync* window, select **File** > **Connection Settings**. The **Connection Settings** window appears.

Figure 3-46 Connection Settings Window

9. In the **Connection Settings** window, select the appropriate check box for the type of connection being used. If using a serial connection, select the COM port from the drop-down list.

If serial, USB and Ethernet communication connections are used, all check boxes can be selected to avoid having to update this window for different connections.

10. Tap **OK** to save any changes made.
11. Ensure the accessory being used to communicate is connected to the host computer and the appropriate power source.

The accessory requires a dedicated port. It cannot share a port with any other device. Refer to the host computer user manual supplied to locate the USB ports.

12. Connect the HMR to the accessory being used for communication.
13. Power on the HMR.
14. If a partnership was already created between the host computer and HMR, synchronization occurs automatically upon connection.

3.13 USB Host Communication Setup

The HMR can be configured as a USB host device for use with USB client devices.

To configure the HMR as a USB host:

1. Tap **Start** > **Settings** > **System** > **USBConfig** icon.

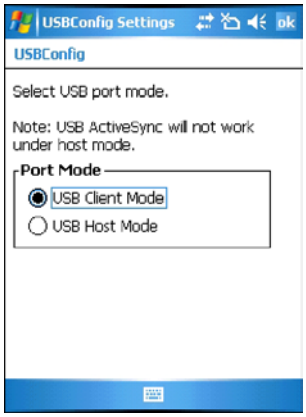


Figure 3-47 USBConfig Settings Window

2. Tap the **USB Host Mode** radio button.
3. Tap **OK**.

When the HMR is configured as a USB host, it cannot ActiveSync with a host computer.

To configure the HMR as a USB client:

1. Tap **Start** > **Settings** > **System** > **USBConfig** icon.
2. Tap the **USB Client Mode** radio button.
3. Tap **OK**.
4. Remove the HMR from the cradle or CAM.
5. Re-insert the HMR into a cradle or re-connect the CAM.

3.14 Wall Mounting Bracket and Shelf Slide

This section describes how to install and set up the MC9000 Wall Mount Bracket and Shelf Slide to mount cradles to a wall.

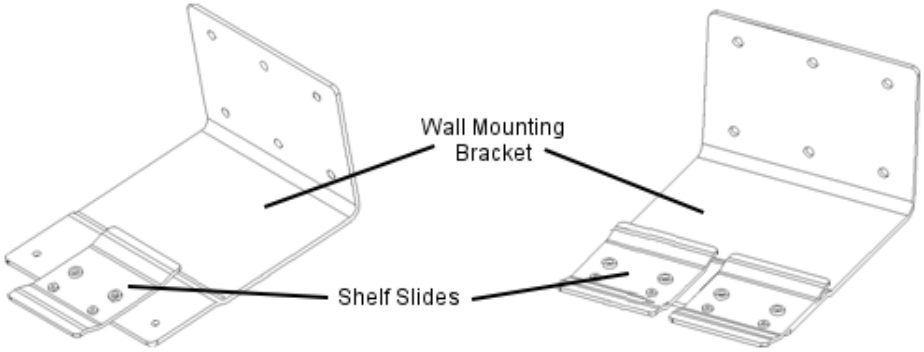


Figure 3-48 Wall Mounting Bracket with Shelf Slide

When installed on a wall, the mounting bracket and shelf slide enable mounting one or two single slot cradles to a wall. Use two brackets to mount a four slot cradle.

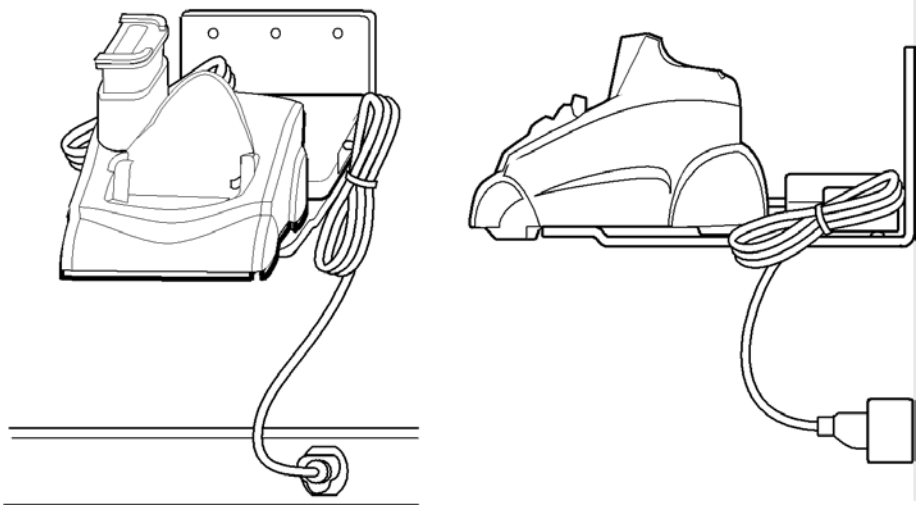


Figure 3-49 Mounted Single Slot Cradle with Power Connection

Installing the Wall Mount Bracket

To install the wall mount bracket for use with one or two single slot cradles or four slot chargers, place the smaller surface of the bracket against the wall or vertical support structure, and secure with four 1/4” screws (use two of the three screw holes in each row).

Figure 3-50 Wall Mounting Bracket Mounting Screws

If using the bracket and slide with a four slot cradle, secure a second bracket to the wall next to the first, aligning the horizontal screw holes on the second with those of the first.

Attaching the Shelf Slide to the Wall Mount Bracket

One Single Slot Cradle/Four Slot Battery Charger

To attach the shelf slide to the wall mount bracket for use with one single slot cradle or four slot battery charger:

1. Place the slide on the bracket, aligning the larger pan-head screw holes in the slide with the center two screw holes on the bracket.
2. Secure the slide to the bracket by inserting the two pan-head screws provided from below the bracket, up through the bracket's screw holes and then through the slide's pan-head screw holes.

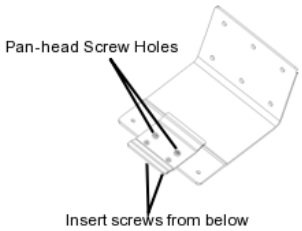


Figure 3-51 Attaching One Shelf Slide

Two Single Slot Cradles/Four Slot Battery Chargers

To attach the shelf slide to the wall mount bracket for use with two single slot cradles or two four slot battery chargers:

1. Place the slide on the bracket, aligning the larger pan-head screw holes in the slide with the left or right two screw holes on the bracket.
2. Secure the slide to the bracket by inserting the two pan-head screws provided from below the bracket, up through the bracket's screw holes and then through the slide's pan-head screw holes.
3. Secure a second slide to the remaining two screw holes on the bracket in the same manner.

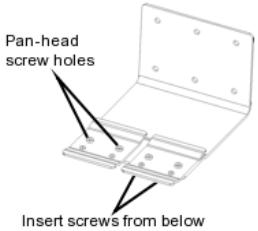


Figure 3-52 Attaching Two Shelf Slides

Four Slot Cradle

To attach the shelf slide to the wall mount bracket for use with a four slot cradle:

- Place a slide on the left-hand bracket, aligning the larger pan-head screw holes in the slide with the left two screw holes on the bracket.
- Secure the slide to the bracket by inserting the two pan-head screws provided from below the bracket, up through the bracket's screw holes and then through the slide's pan-head screw holes.
- Place a slide on the right-hand bracket, aligning the larger pan-head screw holes in the slide with the right two screw holes on the bracket.
- Secure the second slide to the bracket as described in Step 2.

Installing the Cradle/Charger on the Bracket

Install the cradle or charger onto the bracket, inserting the bracket's slide into the grooves on the bottom of the cradle/charger and sliding the cradle/charger into the desired position.

For one single slot cradle/four slot charger, center it on the bracket.

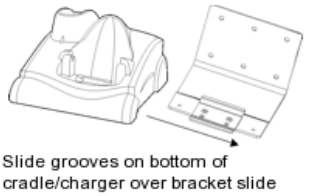


Figure 3-53 Installing One Cradle

For two single slot cradle/four slot chargers, slide one onto the left-hand slide, and one onto the right-hand slide.

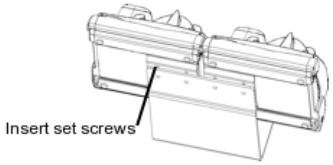


Figure 3-54 Installing Two Cradles

For a four slot cradle, slide the cradle on to the slides, across both brackets.

Secure each cradle or charger to its slide using the two set screws provided.

Chapter 4 Operating the HMR

4.1 Introduction

This chapter explains the physical buttons, status icons and controls on the HMR, how to use the HMR, including instructions for powering on and resetting the HMR, using the stylus and a headset, entering information and scanning.

4.2 Windows Mobile 5.0 Status Icons

Status Bar

The **Status Bar** at the top of the window displays the current time, battery status and communication status.

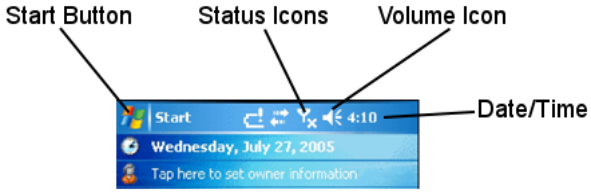


Figure 4-1 Status Bar

Status icons are shown in the **Status Bar** to indicate the present status of the HMR. Tapping each status icon displays the corresponding dialog box, the settings then can be changed or adjusted. The status icons listed in Table 4-1 on the **Status Bar** may be located at the top of the screen.

Table 4-1 Status Icons

Icon	Function	Description
	Speaker	Turns all sounds on and off.
	Battery	Backup battery is very low.
		Main battery is charging.*
		Main battery is low.
		Main battery is very low.
		Main battery is full.*
	Connectivity	Connection is active.
		Synchronization is occurring.
	Antenna	Wireless on/good signal.
		Wireless off.
		No service or searching.

Command Bar

The icons listed in Table 4-2 on the Command Bar may be located at the bottom of the screen.

Figure 4-2 Command Bar

Table 4-2 Command Bar Icons

Icon	Description
	Wireless connection status icon. Indicates WLAN signal strength and opens the Wireless Applications menu.
	The **Bluetooth Enabled** icon appears in the task tray and indicates that the Bluetooth radio is on.
	The **Bluetooth Disabled** icon appears in the task tray and indicates that the Bluetooth radio is off.
	The **Bluetooth Communication** icon appears in the task tray and indicates that the HMR is communicating with another Bluetooth device.
	The **ActiveSync** icon appears in the task tray and indicates an active connection between the HMR and the development computer.

Speaker Icon

Adjust the system volume using the **Speaker** icon in the Status bar.

- Tap the **Speaker** icon. The **Volume** dialog box appears.

Figure 4-3 Volume Dialog Box

When not in a call, the phone volume slider adjusts the volume of the ringer. When in a call, adjusts the volume of the call audio.

- Tap and move the slide bar to adjust the volume.
- Select the **On** or **Off** radio button to turn the volume on or off.

Use can also adjust the system volume using the Sounds & Notifications window or by pressing the Blue key and 6 or the Blue key and 7.

Battery Icon

Battery icons display on the **Title Bar** when the main battery or backup battery power falls below a predetermined level. A **Battery** dialog box also appears indicating the status of the main or backup battery.

Figure 4-4 Battery Status Dialog Box

View the battery status using the **Power** window.

Connectivity Icon

The **Connectivity** icon indicates the communication status of the terminal when it's connecting to the internet or host computer.

Figure 4-5 Connectivity Dialog Box

Time Icon

The **Time** icon displays the current time in a digital or analog format. To change the time format, tap and hold the **Time** icon until a menu appears. Select the desired format.

Figure 4-6 Time Icon Format Menu

To display current date, time and appointments:

- Tap the **Time** icon to display the **Time and Next Appointment** dialog box.

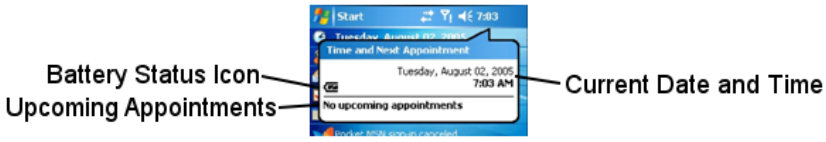


Figure 4-7 Time and Next Appointment Dialog Box

- The dialog box displays the current date and time, the battery status and any upcoming appointments in the **Calendar**.

Instant Message Icon

The **Instant Message** icon provides a notification when **MSN Messenger** has received a new incoming message.

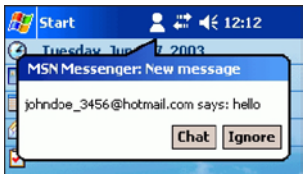


Figure 4-8 MSN Messenger Dialog Box

E-Mail Icon

The **E-Mail** icon provides a notification when an incoming e-mail is received.

Figure 4-9 New E-mail Messages Dialog Box

Multiple Notification Icon

The **Multiple Notification** icon appears when two or more message notifications occur. Tap the icon to display the multiple notification icons.

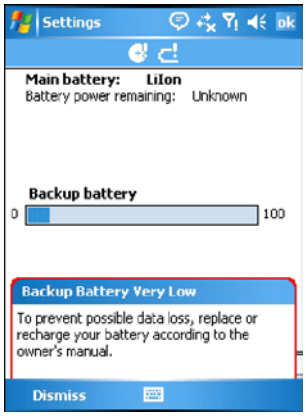


Figure 4-10 Multiple Notifications Icon

4.3 Locking the HMR

Use the Device Lock feature to prevent use of the device. When locked, the HMR does not respond to screen or keypad input. To lock the device, tap the **Device unlocked** icon. The icon changes to locked.

Figure 4-11 Device Locked/Unlocked Icons

To unlock the device and free it for use, tap **Unlock**.

Figure 4-12 Unlock Device Window

Tap **Unlock** on the **Unlock Device** window.

4.4 LED Indicators

The HMR has an LED Indicator Bar that contains LEDs that indicate scanning and charging status. Table 4-3 describes the LED indications.

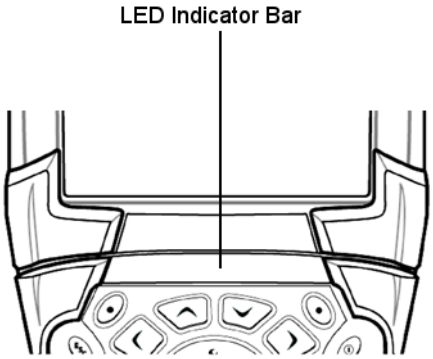


Figure 4-13 HMR LEDs Indicator Bar

Table 4-3 HMR LED Indications

LED State	Indication
Solid Red	Laser enabled, scanning/imaging in process.
Solid Green	Successful decode/capture.
Slow Blinking Amber	Main battery in HMR is charging.
Fast Blinking Amber	Error in charging; check placement of the HMR.
Solid Amber	Main battery in HMR is fully charged.

The RFID read enabled and successful RFID tag read indications are displayed on the screen, not on the LED indicators.

4.5 Keypads

The HMR has the following modular keypad:

- 53-key keypad

The modular keypads can be removed in the field, as necessary.

53-Key Keypad for the HMR

The 53-key keypad contains a Power button, application keys, scroll keys and function keys. The keypad is color-coded to indicate the alternate function key (blue) values. Note that keypad functions can be changed by an application so the HMR's keypad may not function exactly as described. See Table 4-4 for key and button descriptions and

Table 4-5 for the keypad's special functions.

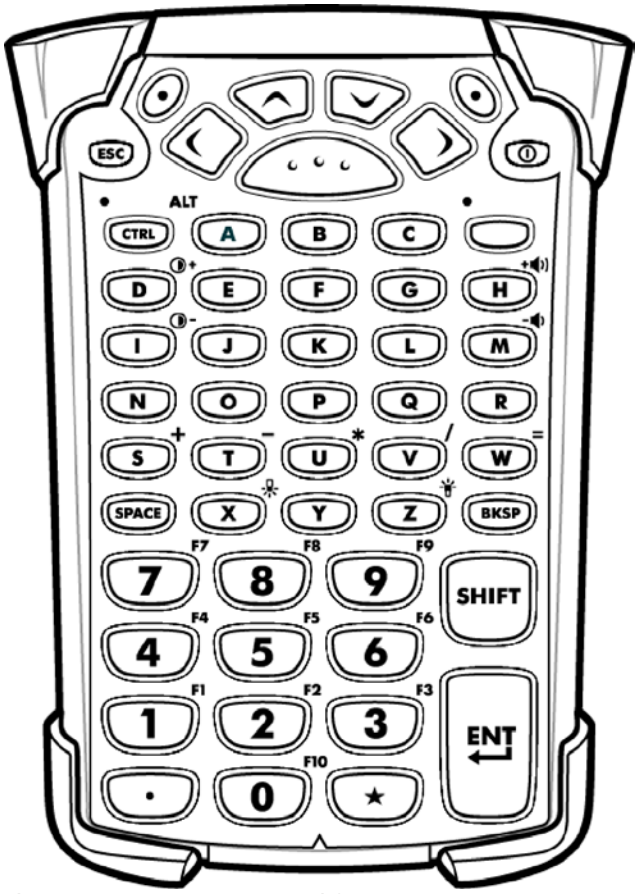


Figure 4-14 53-Key Keypad for HMR

Table 4-4 53-Key Descriptions

Key	Description
Power (red) 	Turns the HMR on and off. Performs a warm boot and a cold boot. See Resetting the HMR on page 74 for information about performing a warm and cold boot.
Green/Red Dot 	To use a key as an application key (APP key) on the keyboard, a new keyboard remap table must be created and installed. However, the Green/Red dot keys can be remapped as APP keys through the registry. Create an XML Provisioning file with the following entries: Characteristic type="HKEY_LOCAL_MACHINE\HARDWARE\DEVICEMAP\KEYBD" Parm name = "GreenKeyOverride" value = "xx", where xx is the new APP key code. Parm name = "RedKeyOverride" value = "xx", where xx is the new APP key code. Refer to XML Provisioning on page 151 for instruction on updating the registry using XML Provisioning. This sends an APP key code, instead of their original key codes, when the green or red dot key is pressed.
Scan (yellow) 	Activates the scanner/imager in a scan enabled application.
Scroll Up and Down 	Moves up and down from one item to another. Increases/decreases specified values.
Scroll Left and Right 	Moves left and right from one item to another. Increases/decreases specified values.
ESC 	Exits the current operation.
Alpha 	Use the alpha keys for alphabetic characters.
SPACE/BKSP 	Space and backspace functions.
Numeric/Application 	Numeric value keys – can have applications assigned with function key(s). The **F6** and **F7** keys cannot be remapped and are dedicated by the Operating System to control volume level. When these keys are pressed, Shell.exe traps them and displays the volume adjustment window. To get these keys to an application, call GXOpenInput() at the beginning of the application and call GXCloseInput() at the end of the application. This redirects all of the key events to an application, including the **F6** and **F7** keys.

Key	Description
Function (blue) 	Press and release the blue function key to activate the keypad alternate functions (shown on the keypad in blue). The icon appears at the bottom of the screen on Windows Mobile 5.0 devices. Press and release the blue function key again to return to the normal keypad functions.
Control 	Press and release the CTRL key to activate the keypad alternate CTRL functions. The CTRL icon appears at the bottom of the screen on Windows Mobile 5.0 devices. Press the Blue key followed by the CTRL key to activate the keypad alternate ALT functions. The ALT icon appears at the bottom of the screen on Windows Mobile 5.0 devices.
Shift 	Press and release the SHIFT key to reactive the keypad alternate SHIFT functions. The icon appears at the bottom of the screen on Windows Mobile 5.0 devices. Press and release the SHIFT key again to return to normal keypad functions.
Period/Decimal Point 	Produces a period for alpha entries and a decimal point for numeric entries.
Star 	Produces an asterisk.
Enter 	Executes a selected item or function. The default behavior of the ENT (Enter) key sends an extra character, which causes a Microsoft Word or Notes application to exit. To make the applications work properly, create an XML Provisioning file with the following entries: Characteristic type=”HKEY_LOCAL_MACHINE\HARDWARE\DEVICEMAP\KEYBD” Parm name = “SpecialEnterTabKey” value=0 Refer to XML Provisioning on page 151 for instruction on updating the registry using XML Provisioning.

Keypad Special Functions

The keypad special functions are color coded on the keypads. For example, on the 53-key keypad, the display backlight icon is blue indicating that the blue function key must be selected first to access the display backlight.

Table 4-5 Keypad Special Functions

Icon	53-Key, Keypad	Special Function
	Blue key + **Z**	Turns on and off the display backlight.
	Blue key + **X**	Turns on and off the keypad backlight.
	Blue key + **D**	Color units: Increases display backlight intensity.
	Blue key + **I**	Color units: Decreases display backlight intensity.
	Blue key + **H**	Increase scan decode beeper volume.
	Blue key + **M**	Decreases scan decode beeper volume.
ALT	Blue key + **CTRL**	Enables Alt keypad functions.

Use of display and keypad backlighting can significantly reduce battery life.

4.6 Using the Power Button

Press the red Power button to turn the HMR screen on and off (suspend mode). The HMR is on when the screen is on and the HMR is in suspend mode when the screen is off. For more information, see Starting the HMR on page 17.

The Power button is also used to reset the HMR by performing a warm or cold boot.

- Warm Boot (Soft Reset) – Resets the HMR. Operating system and all applications are restarted. File storage is preserved.
- Cold Boot (Hard Reset) – Resets the HMR. Operating system and all applications are restarted. File storage is preserved. Real-Time Clock (RTC) is reset. Normally only used when a Warm Boot does not initiate.

Applications that are added to the Application folder are not removed when a cold boot is performed. The Application folder is in flash memory.

4.7 Using a Headset

Use a stereo headset or a Bluetooth headset for audio communication when an audio enabled application is used. To use a headset, plug the headset jack into the audio connector on the side of the HMR. Ensure that the HMR volume is set appropriately before putting the headset on. When a headset is plugged into the jack, the speakerphone is muted.

4.8 Data Capture

The HMRs use an integrated imager to collect data by decoding one dimensional bar codes (including RSS) and two dimensional bar codes (including PDF417 and DataMatrix), and capture and download images to a host for a variety of imaging applications.

Laser Scanning

HMRs with an integrated laser scanner have the following features:

1. Reading of a variety of bar code symbologies, including the most popular linear, postal, and 1-D code types.

2. Advanced intuitive laser aiming for easy point-and-shoot operation.

Imaging

The HMRs with an integrated imager have the following features:

- Omnidirectional reading of a variety of bar code symbologies, including the most popular linear, postal, PDF417 and 2-D matrix code types.
- The ability to capture and download images to a host for a variety of imaging applications.
- Advanced intuitive laser aiming for easy point-and-shoot operation.

The imager uses digital camera technology to take a digital picture of a bar code, stores the resulting image in its memory and executes state-of-the-art software decoding algorithms to extract the data from the image.

Aiming the Imager

The HMR integrated imager projects a laser aiming pattern (field of view) similar to those used on cameras. The aiming pattern is used to position the bar code or object within the field of view.

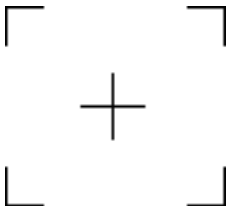


Figure 4-15 Laser Aiming Pattern (Field of View)

Operational Modes

HMRs with an integrated imager have three modes of operation: Decode Mode, Pick List Mode, and Image Capture Mode. All modes are activated by pulling the trigger or pressing the Scan button.

Decode Mode

This mode allows the user to decode a bar code when a single bar code is in the HMR's field of view. The Imager remains in this mode as long as the trigger is pulled, or until a bar code is decoded.

Pick List Mode

Pick List mode allows the user to selectively decode a bar code when more than one bar code is in the HMR's field of view. By moving the aiming crosshair over the wanted bar code the user can selectively read only the required bar code. This feature is particularly valued for pick lists containing multiple bar codes and manufacturing or transport labels containing more than one bar code type (either 1D or 2D).

Image Capture Mode

This mode allows the user to capture an image within the HMR's field of view. The user can use the HMR to capture signatures or images of items like damaged boxes.

Scanning Considerations

Typically, scanning is a simple matter of aim, scan/decode and a few quick trial efforts master it. However, two important considerations can be used to optimize any scanning performance.

- Range
  Any scanning device decodes well over a particular working range — minimum and maximum distances from the bar code. This range varies according to bar code density and scanning device optics.

  Scanning within range brings quick and constant decodes; scanning too close or too far away prevents decodes. Move the scanner closer and further away to find the right working range for the bar codes being scanned. However, the situation is complicated by the availability of various integrated scanning modules. The best way to specify the appropriate working range per bar code density is through a chart called a decode zone for each scan module. A decode zone simply plots working range as a function of minimum element widths of bar code symbols.
- Angle
  Scanning angle is important for promoting quick decodes. Do not scan at too sharp an angle; the scanner needs to collect the image to make a successful decode. Practice quickly shows what tolerances work.

Contact the Symbol Support Center if chronic scanning difficulties develop. Decoding of properly printed bar codes should be quick and effortless.

Scanning Bar Codes

1. Ensure that a scan enabled application is loaded on the HMR.
2. Aim the scan exit window at the bar code.
3. Pull the trigger.
   - For HMRs with a laser scanner, ensure the red scan beam covers the entire bar code. The red scan LED lights to indicate that the laser is on. The green scan LED lights and an audible beep sounds, by default, to indicate the bar code was decoded successfully.

Figure 4-16 Laser Scanner Aiming Pattern

   - For HMRs with an imager, place the bar code in any orientation within the aiming pattern. Ensure the entire symbol is within the rectangular area formed by the brackets in the aiming pattern. The red laser aiming pattern turns on to assist in aiming. If necessary, the HMR turns on its red LED to illuminate the target bar code. The green scan LED lights and an audible beep sounds, by default, to indicate the bar code was decoded successfully. Note that when the HMR is in Pick List Mode, the bar code is not decoded until the crosshair is touching the bar code.

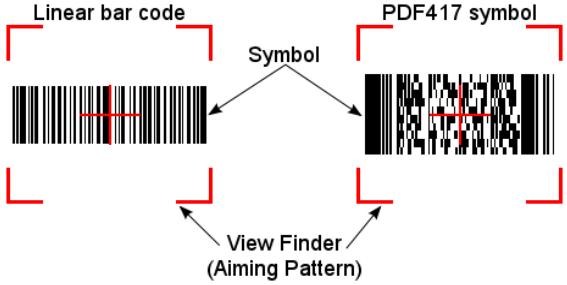


Figure 4-17 Bar Code Centered in Aiming Pattern

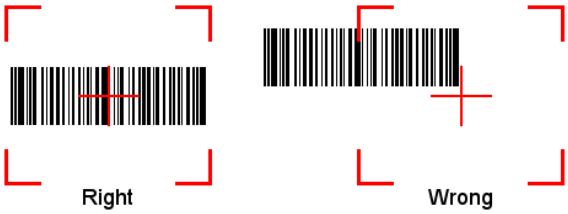


Figure 4-18 Bar Code Not Centered in Aiming Pattern

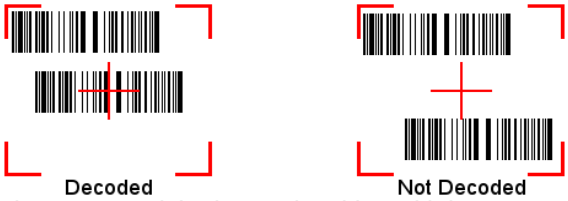


Figure 4-19 Pick List Mode with Multiple Bar Codes in Aiming Pattern

4. Release the trigger.

Imager decoding usually occurs instantaneously. The HMR repeats the steps required to take a digital picture (image) of a poor or difficult bar code, as long as the trigger remains pulled.

Scanning Tips

Optimal scanning distance varies with bar code density and scanner optics.

- Hold the scanner farther away for larger symbols.
- Move the scanner closer for symbols with bars that are close together.

Scanning procedures depend on the application and HMR configuration. An application may use different scanning procedures from the one listed above.

Scan LED Indicator

The Indicator LED bar on the HMR provides a visual indication of the scan status.

Table 4-6 Scan LED Indicators

LED Status	Indication
Off	Not scanning.
Solid Red	Laser enabled, scanning/imaging in process.
Solid Green	Successful decode.

4.9 Resetting the HMR

There are two reset functions, warm boot and cold boot.

- A warm boot restarts the HMR and closes all running programs.
- A cold boot also restarts the HMR and closes all running programs but also resets the Real-Time-Clock (RTC).

Data saved in flash memory or a memory card is not lost. Perform a warm boot first. This restarts the HMR and saves all stored records and entries. If the HMR still does not respond, perform a cold boot.

Performing a Warm Boot

Hold down the Power button for approximately five seconds. As soon as the HMR starts to perform a warm boot release the **Power** button.

Performing a Cold Boot

A cold boot restarts the HMR and erases all user stored records and entries that are not saved in flash memory (Application and Platform folders) or a memory card. *Never perform a cold boot unless a warm boot does not solve the problem.*

⚠ Do not hold down any key, button or the trigger, other than the Power button during a reset. Performing a cold boot restores formats, preferences and other settings to the default settings.

ℹ Any data previously synchronized with a computer can be restored during the next ActiveSync operation.

To perform a cold boot:

- Press the primary battery release on the HMR to partially eject the battery from the HMR.
- While the battery is partially released, simultaneously press and release the trigger and the **Power** button.
- Push the battery to fully re-insert it in the HMR. One audible click can be heard as the battery is fully inserted.
- The HMR initializes.

Waking the HMR

The wakeup conditions define what actions wakeup the HMR. These settings are configurable and the factory default settings shown in Table 4-7 are subject to change/update.

Table 4-7 Wakeup Conditions (Default Settings)

Status	Description	Conditions for Wakeup
Power Off	When the HMR is set to the suspend mode by pressing **Power**, these actions wake the HMR.	1. **Power** button is pressed. 2. AC power added or removed. 3. Cradle/cable connect or disconnect.
		Key or scan button is pressed.
		Real Time Clock set to wake up.
Auto Off	When the HMR goes into suspend mode by an automatic power-off function, these actions wake the HMR.	1. **Power** button is pressed. 2. AC power added or removed. 3. Cradle/cable connect or disconnect.
		Key or scan button is pressed.
		Real Time Clock set to wake up.

4.10 Bluetooth

The HMR is a Bluetooth-equipped device that can communicate without wire, using frequency-hopping spread spectrum (FHSS) RF to transmit and receive data in the 2.4 GHz Industry Scientific and Medical (ISM) band (802.15.1). Bluetooth wireless technology is specifically designed for short-range (30 feet/10 meters) communications and low power consumption.

HMRs with Bluetooth capabilities can exchange information (e.g., files, appointments, and tasks) with other Bluetooth enabled devices such as phones, printers, access points, and other HMRs. In addition, a dial-up modem connection can be created between the Bluetooth HMR and a Bluetooth enabled phone. The Bluetooth phone can then be used as a modem.

See Chapter 5 for more information on Bluetooth.

Chapter 5 Bluetooth

5.1 Introduction

Bluetooth-equipped devices can communicate without wires, using frequency-hopping spread spectrum (FHSS) RF to transmit and receive data in the 2.4 GHz Industry Scientific and Medical (ISM) band (802.15.1). Bluetooth wireless technology is specifically designed for short-range (30 feet/10 meters) communications and low power consumption.

HMRs with Bluetooth capabilities can exchange information (e.g., files, appointments and tasks) with other Bluetooth enabled devices such as phones, printers, access points and other HMRs. In addition, a dial-up modem connection can be created between the Bluetooth HMR and a Bluetooth enabled phone. The Bluetooth phone can then be used as a modem.

HMRs with Bluetooth technology use the StoneStreet One Bluetooth stack. To program Bluetooth within the HMR refer to the StoneStreet One SDK.

5.2 Adaptive Frequency Hopping

Adaptive Frequency Hopping (AFH) is a method of avoiding fixed frequency interferers. AFH can be used with Bluetooth voice. All devices in the piconet (Bluetooth network) must be AFH-capable in order for AFH to work. There is no AFH when connecting and discovering devices. Avoid making Bluetooth connections and discoveries during critical 802.11b communications. AFH for Bluetooth can be broken-down into four main sections:

1. Channel Classification - A method of detecting an interference on a channel-by-channel basis, or pre-defined channel mask.
2. Link Management - Coordinates and distributes the AFH information to the rest of the Bluetooth network.
3. Hop Sequence Modification - Avoids the interference by selectively reducing the number of hopping channels.
1. Channel Maintenance - A method for periodically re-evaluating the channels.

When AFH is enabled, the Bluetooth radio “hops-around” (instead of through) the 802.11b high-rate channels. AFH coexistence allows HMRs to operate in any infrastructure. AFH is always enabled in the HMR.

The Bluetooth radio in this HMR operates as a Class 2 device power class. The maximum output power is 2.5mW and the expected range is up to 32.8 feet (10 meters). A definitive definition of ranges based on power class is difficult to obtain due to power and device differences, and whether one measures open space or closed office space.

It is not recommended to perform Bluetooth wireless technology inquiry when high rate 802.11b operation is required.

5.3 Security

The current Bluetooth specification defines security at the link level. Application-level security is not specified. This allows application developers to define security mechanisms tailored to their specific need. Link-level security is really between devices not users, while application-level security can be implemented on a per-user basis. The Bluetooth specification defines security algorithms and procedures needed to authenticate devices, and if needed, encrypt the data flowing on the link between the devices. Device authentication is a mandatory feature of Bluetooth while link encryption is optional.

Pairing of Bluetooth devices is accomplished by creating an initialization key that is used to authenticate the devices and create a link key for them. Entering a common PIN number in the devices being paired generates the initialization key. The PIN number is never sent over the air. By default, the Bluetooth stack responds with no key when a key is requested (it is up to user to respond to the key request event). Authentication of Bluetooth devices is based-upon a challenge-response transaction. Bluetooth allows for a PIN number or passkey that is used to create other 128-bit keys used for security and encryption. The encryption key is derived from the link key used to authenticate the pairing devices. Also worthy of note is the limited range and fast frequency hopping of the Bluetooth radios that makes long-distance eavesdropping difficult.

It is recommended:

- Perform pairing in a secure environment
- Keep PIN codes private and don't store the PIN codes in the HMR
- Implement application-level security.

5.4 Turning the Bluetooth Radio Mode On and Off

Turn off the Bluetooth radio to save power or if entering an area with radio restrictions (e.g., an airplane). When the radio is off, the HMR can not be seen or connected to by other Bluetooth devices. Turn on the Bluetooth radio to exchange information with other Bluetooth devices (within range). Communicate only with Bluetooth radios in close proximity.

To achieve the best battery life in HMRs with multiple radios, turn off the radios that are not being used.

Disabling Bluetooth

To disable Bluetooth, tap **Bluetooth** icon > **Disable Bluetooth**. The **Bluetooth** icon changes to indicate that Bluetooth is disabled. An exclamation point appears with the icon.

Figure 5-1 Disable Bluetooth

Enabling Bluetooth

To enable Bluetooth, tap **Bluetooth** icon > **Enable Bluetooth**. The **Bluetooth** icon changes to indicate that Bluetooth is enabled.

Figure 5-2 Enable Bluetooth

Bluetooth Power States

Cold Boot

When a cold boot is performed on the HMR, Bluetooth turns off. It is normal to see the **Bluetooth** icon appear and disappear, as well as a wait cursor, when initialization proceeds in all modes.

Warm Boot

When a warm boot is performed on the HMR, Bluetooth returns to the disabled state (off).

Suspend

When the HMR suspends, Bluetooth turns off.

When the HMR is placed in suspend mode, the Bluetooth radio mode powers off and the piconet (Bluetooth connection) is dropped. When the HMR resumes, it could take up to 10 seconds for the Bluetooth radio driver to re-initialize the radio.

Resume

When the HMR resumes, Bluetooth turns on if it was on prior to suspend. Note that any Bluetooth connection that was dropped during a suspend needs to be reconnected after a resume.

5.5 Bluetooth Profiles

The HMR is loaded with a number of Bluetooth services profiles. These profiles can be loaded or removed from memory. If a profile is not used, it can be removed to save memory. To load or remove profiles:

- Tap  > Programs > BTProfileSelector. The ProfileSelector window appears.

Figure 5-3 Bluetooth Profile Selector Window

- Tap a check box next to the profile to load (activate).
  The Serial Port profile is always active and cannot be removed.
- Tap **Select All** to select all profiles or tap **Deselect All** to deselect all profiles.
- Tap **Apply** to activate the profiles and then **Close** to exit the application.

See Services Tab on page 142 for more information on selecting services.

5.6 Modes

The BTExplorer application has two mode for managing Bluetooth connections: Wizard Mode and Explorer Mode. The Wizard Mode is for novice Bluetooth users and the Explorer Mode is for experienced Bluetooth users.

Wizard Mode

Wizard Mode provides a simple step by step process for discovering and connecting to Bluetooth devices. The wizard takes you through the entire process.

When switching between Wizard Mode and Explorer Mode, all active connections are closed.

The following steps provide an example for using the Wizard to services for remote devices.

1. Tap the **Bluetooth** icon and select **Show BTExplorer**. The **BTExplorer** window appears.
2. Tap **File** > **New Connection**. The **New Connection Wizard** window appears.

Figure 5-4 New Connection Wizard Window

3. Select an action from the drop-down list. In this example, **Explore Services on Remote Device** is selected.
4. Tap **Next**. The **BTExplorer** searches for Bluetooth devices in the area and displays the devices in the **Select Remote Device** window.

Figure 5-5 Select Remote Device Window

Devices discovered previously are listed to save time. To start a new device discovery, tap and hold and select Discover Devices from the menu.

5. Select a device from the list and then tap **Next**. The **Connection Favorite Options** window appears.

Figure 5-6 Connection Favorite Options Window

6. Select **Save As Favorite** check box to save this service in the **Favorite** view.
7. In the **Favorite Name** text box, enter a name for this service that will appear in the **Favorite** list.
8. Tap **Next**. The **Connection Summary** window appears.

Figure 5-7 Connection Summary Window

9. Tap **Connect** to connect to the service.

The following actions are available in the drop-down list (actions may vary depending upon configurations):

1. Explore Services on Remote Device
2. Pair with a Remote Device
3. Active Sync via Bluetooth
4. Browse Files on Remote Device
5. Connect to Internet Using Access Point
6. Connect to Internet Using Phone/Modem
7. Connect to a Personal Area Network
8. Send or Exchange Objects
9. Associate Serial Port

Explorer Mode

The **BTExplorer** window is streamlined and easy to navigate and provides greater control to users familiar with Bluetooth functionality. The menu bar provides quick access to the options and tools used to connect to devices.

Figure 5-8 Explorer Mode Window

You can also use the “tap and hold” technique to view available options. Scroll bars and view options are like those you’re familiar with on your Windows desktop. The tree structure lists the following sub-items:

1. Local Device – This HMR.
2. Remote Device – Other Bluetooth devices.
   a. Trusted Devices – Bonded (paired) Bluetooth devices
   b. Untrusted Devices – Discovered devices that are not bonded
3. Favorites – Selected services that are set as being *Favorite* for quick access.

Switching between Wizard Mode and Explorer Mode closes all active connections.

5.7 Discovering Bluetooth Device(s)

Follow the steps below to discover Bluetooth devices. The HMR can receive information from discovered devices, without bonding. However, once bonded, an exchange of information between the HMR and a bonded device occurs automatically when the Bluetooth radio is turned on.

To find Bluetooth devices in the area:

1. Ensure that the Bluetooth device being looked for is in discoverable mode.
2. Ensure that the two devices are within 30 feet (10 meters) of one another.
3. Tap the **Bluetooth** icon and select **Show BTExplorer**. The **BTExplorer** window appears.

Figure 5-9 BTExplorer Window

4. Tap and hold **Remote Devices** and select **Discover Devices** from the pop-up menu. The HMR searches for Bluetooth devices in the area.

Figure 5-10 Discover Devices

5. The discovered devices display in the **Untrusted Devices** folder.

Figure 5-11 Discovered Devices Listed in Untrusted Folder

Bonding with Discovered Device(s)

A bond is a relationship created between the HMR and another Bluetooth device in order to exchange information in a secure manner. Creating a bond involves entering the same PIN on the two devices to bond. Once a bond is created, and the Bluetooth radios are turned on, the devices recognize the bond and are able to exchange information without re-entering a PIN.

To bond with a discovered Bluetooth device:

1. Discover remote devices. See Discovering Bluetooth Device(s) on page 82.
2. In the **Untrusted Devices** folder, tap and hold on a device to pair with.

Figure 5-12 Pair a Remote Device

3. Select **Pair** from the pop-up menu.
4. On the HMR, the **PIN Code Request** window appears.

Figure 5-13 PIN Code Request Window

5. In the **PIN Code:** text box, enter the PIN number (between 1 and 16 characters) and then tap **OK**.
6. On the remote device, enter the same PIN number.
7. The devices are successfully paired. The device name moves to the **Trusted Devices** folder.

Figure 5-14 Bonded (Paired) Discovered Device

Renaming a Bonded Device

If it is necessary to rename a bonded device, it can be done from the **BTExplorer** window.

1. Launch **BTExplorer**.
2. Tap and hold the device to rename and select **Rename** in the pop-up menu.

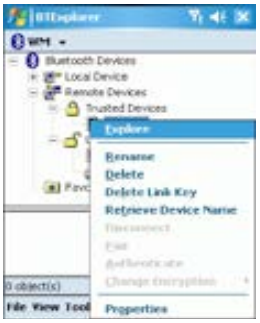


Figure 5-15 Rename Device Selection Dialog Box

3. The **Change Device Name** window appears.

Figure 5-16 Change Device Name Window

4. Enter a new name for the bonded device in the text box. Tap **OK**.

Deleting a Bonded Device

If it is no longer necessary to connect with a device, delete it from the **Bluetooth Bonded Devices** window.

- Launch **BTExplorer**.
- Tap and hold the device to delete and select **Delete** in the pop-up menu.

Figure 5-17 Delete a Bonded Device

- A confirmation dialog appears. Tap **Yes**.

Accepting a Bond

When a remote device wants to bond with a HMR you give permission by entering a PIN when requested.

1. Ensure that the HMR is set to discoverable and connectable. See Bluetooth Settings on page 93.
2. When prompted to bond with the remote device the **PIN Code Request** window appears.

Figure 5-18 PIN Code Request Window

Connections to untrusted devices are a security risk.

3. In the **PIN Code:** text box, enter the same PIN that was entered on the device requesting the bond. The PIN must be between 1 and 16 characters.
4. In the **Device Name:** text box, edit the name of the device requesting the bond, if desired.
5. Tap **OK**.
6. The bond is created and the HMR can now exchange information with the other device.

5.8 Discovering Services

Before services can be used, you must first discover remote devices and then bond to those devices. To determine what services are available on a bonded remote device:

1. Tap the **Bluetooth** icon and select **Show BTExplorer**.
2. In **BTExplorer** window, tap and hold on the remote device and select **Explore** from the pop-up menu.

Figure 5-19 Discovering Services

3. The HMR communicates with the remote device and then lists the services under the device name.

Figure 5-20 List of Discovered Services

Some examples of available services are:

1. File Transfer Services
2. Dial-Up Networking Services
3. Headset or Hands-Free Services
4. OBEX Object Push Services
5. Serial Port Services
6. IrMA Synchronization Services

These services are discussed in the following paragraphs.

File Transfer Services

Shared folders are a security risk.

To transfer files between the HMR and another Bluetooth enabled device:

1. Ensure the HMR is discoverable and connectable. See Bluetooth Settings on page 93.
2. Discover and bond (pair) with the remote access point. See Bonding with Discovered Device(s) on page 83.
3. In **BTExplorer**, select the **Remote Devices** folder.
4. Select the **Trusted Devices** folder.
5. Tap the remote device folder.
6. Tap and hold on the remote device and select **Explore** from the pop-up menu.
7. Tap and hold on **File Transfer** and select **Connect**. The remote device's accessible folders appear.
8. Select a folder. The contents of the folder appear in the sub-window.

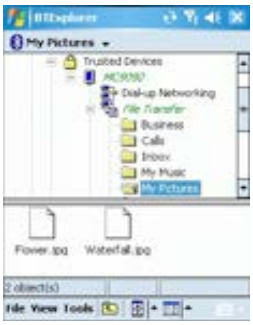


Figure 5-21 Remote Device Folders

9. Tap and hold on the file. A pop-up menu appears.
10. Select the action to perform:
    a. *New* – create a new file or folder on the remote device.
    b. *Delete* – delete the selected file on the remote device.
    c. *Get File* – copy the file from the remote device to the HMR.
    d. *Put File* – copies a file from the HMR to the remote device.

Create New File or Folder

To create a new folder or file on the remote device:

1. Tap and hold on the file and select **New** > **Folder** or **New** > **File**. The **Create New Folder** or **Create New File** window appears.
2. Enter the name for the new folder or file. Tap **OK**.
3. A new folder or file is created on the remote device.

Delete File

To delete a file from the remote device:

1. Tap and hold on the file and select **Delete**.
2. In the **Delete Remote Device File** dialog box tap **OK**.

Get File

To copy a file from a remote device:

- Tap and hold on the file and select **Get**. The **Save Remote File** window appears.
- Navigate to the directory to save the file.
- Tap **Save**. The file is transferred from the remote device to the HMR.

Put File

To copy a file to a remote device:

1. Tap and hold on the file and select **Put**. The **Send Local File** window appears.
2. Navigate to the directory to save the file and select a file.
3. Tap **Open**. The file is transferred from the HMR to the remote device.

Connect to the Internet Using Access Point

This section explains how to access a Bluetooth-enabled LAN access point (AP) for a network connection. With this method of communication the Internet Explorer can be used to connect to a server.

1. Ensure the HMR is discoverable and connectable. See Bluetooth Settings on page 93.
2. Discover and bond (pair) with the remote access point. See Bonding with Discovered Device(s) on page 83.
3. In **BTExplorer**, select the **Remote Devices** folder.
4. Select the **Trusted Devices** folder.
5. Tap the remote device folder.
6. Tap and hold on the remote device and select **Explore** from the pop-up menu.
7. Tap and hold **LAN Access using PPP** service and select **Connect** from the pop-up menu.
8. The HMR connects with the Access Point.
9. Tap **Start** > **Internet Explorer**. The **Internet Explorer** *window* appears.
10. In the address field, enter an internet address and tap the **Enter** button. The web page loads.

Dial-Up Networking Services

To use a phone that has Bluetooth capabilities as a modem for the HMR, create a Bluetooth modem connection on the HMR and send information to the phone using Bluetooth. The phone relays the information over the phone line and sends back to the HMR any information that was requested over the connection. Once a modem connection is created to the Bluetooth phone, it can be reused.

Prior to creating a connection, ensure the following:

1. Bluetooth phone is turned on.
2. Bluetooth phone is discoverable. (Some phones may also need to be pairable in order to accept a bonding request. For more information, refer to the phone documentation.)
3. HMR's and phone's Bluetooth radios are turned on.
4. HMR and phone are within range of each other (30 feet/10 meters).

Complete the following steps to create a new Bluetooth connection. Before setting up dial-up networking, obtain dial-up information and other necessary settings for the office network or ISP.

1. Ensure the HMR is discoverable and connectable. See Bluetooth Settings *on page 88*.
2. Discover and bond (pair) with the remote device. See Bonding with Discovered Device(s) on page 83.
3. In **BTExplorer**, select the **Remote Devices** folder.
4. Select the **Trusted Devices** folder.
5. Tap the remote device folder.
6. Tap and hold on **Dial-up Networking** and select **Connect** from the pop-up menu. The **Select Dial-up Networking Entry** window appears.

Figure 5-22 Select Dial-up Networking Entry Window

If a dial-up entry is not listed, see Add a Dial-up Entry on page ***90***.

7. Select a dial-up entry.
8. Tap **OK**. The HMR begins to communicate with the phone. If required, the phone requests permission to communicate with the HMR.
9. Confirm the connection on the phone. The **Network Log On** window appears.

Figure 5-23 Network Log On Window

10. In the **User name:** text box, enter the user name for this connection.
11. In the **Password:** text box, enter the password for this connection.
12. In the **Domain:** text box, enter the domain for this connection, if required.
13. Tap **OK**.
14. The phone begins dialing.
15. The phone connects to the network.
16. To end a session, tap the **Connection** icon and then tap **Disconnect** in the dialog box.

Add a Dial-up Entry

To add a dial-up entry:

1. In the **Select Dial-up Networking Entry** window, tap and hold and then select **Add Entry** from the pop-up menu.

Figure 5-24 Add Dial-Up Entry

2. The **Add Phone Book Entry** window appears.

Figure 5-25 Add Phone Book Entry

3. In the **Name for the connection** text box, enter a name for this connection.
4. In the **Country Code** text box, enter the country code for the country that you are calling.
5. In the **Area Code** text box, enter the area code.
6. In the **Phone Number** text box, enter the phone number.
7. Tap **OK**.

OBEX Object Push Services

Object Exchange (OBEX) is a set of protocols allowing objects such as Contacts or pictures to be shared using Bluetooth.

To exchange contact information with another Bluetooth enabled device:

1. Ensure the HMR is discoverable and connectable. See Bluetooth Settings *on page 88*.
2. Discover and bond (pair) with the remote device. See Bonding with Discovered Device(s) *on page 83*.
3. In **BTExplorer**, select the **Remote Devices** folder.
4. Select the **Trusted Devices** folder.
5. Tap the remote device folder.

6. Tap and hold on **OBEX Object Push** and select **Connect**. The **OBEX Object Push** window appears.
7. In the **Action** drop-down list, select one of the options: **Send Contact Information**, **Swap Contact Information**, **Fetch Contact Information** or **Send a Picture**.

Send a Picture

To send a picture to another device:

1. Ensure the HMR is discoverable and connectable. See Bluetooth Settings *on page 88*.
2. Discover and bond (pair) with the remote device. See Bonding with Discovered Device(s) *on page 83*.
3. In **BTExplorer**, select the **Remote Devices** folder.
4. Select the **Trusted Devices** folder.
5. Tap the remote device folder.
6. Tap and hold on **OBEX Object Push** and select **Connect**. The **OBEX Object Push** window appears.

Figure 5-26 OBEX Object Push Window

7. In the **Action** drop-down list, select **Send A Picture**.
8. Tap . The **Send Local Picture** window appears.

Figure 5-27 Send Local Picture Window

9. Navigate to the picture that you want to send to the other device.
10. Tap **Open**.
11. Tap **OK**. The picture is sent to the other device and a confirmation dialog box appears on the other device to accept the picture. A **Send Picture** dialog appears.
12. Tap **OK**.

Headset Services

To connect to a Bluetooth headset:

1. Ensure the HMR is discoverable and connectable. See Bluetooth Settings *on page 88*.
2. Discover and bond (pair) with the headset. See Bonding with Discovered Device(s) *on page 83*.
3. In **BTExplorer**, select the **Remote Devices** folder.
4. Select the **Trusted Devices** folder.
5. Tap the remote device folder.
6. Tap and hold on the remote device and select **Explore**. A headset service item appears.
7. Tap and hold on the headset service name and select **Connect**.
8. The HMR connects to the headset. Refer to your headset user manual for instruction on communicating with a Bluetooth device.
9. To answer a phone call, press the Green Dot button on the HMR and press the Red Dot button to end a call.

If the HMR goes into suspend mode while in a call, the Bluetooth headset disconnects from the HMR and audio is re-directed to the speakerphone.

To adjust the microphone gain:

1. Tap and hold on the headset service item and select **Adjust Microphone** from the pop-up menu. The **Microphone Properties** window appears.
2. Select the slider and adjust the gain.
3. Tap **OK**.

Serial Port Services

By default, COM ports COM4, COM5 and COM9 are Bluetooth virtual ports. If an application opens one of these ports, the Bluetooth driver activates and guides you through a Bluetooth connection.

Use the wireless Bluetooth serial port connection just as you would a physical serial cable connection. You must configure the application that will use the connection to the correct serial port.

To establish a serial port connection:

1. Ensure the HMR is discoverable and connectable. See Bluetooth Settings *on page 88*.
2. Discover and bond (pair) with the remote device. See Bonding with Discovered Device(s) *on page 83*.
3. In **BTExplorer**, select the **Remote Devices** folder.
4. Select the **Trusted Devices** folder.
5. Tap the remote device folder.
6. Tap and hold **Serial Port** and select **Connect** in the pop-up menu. The **Remote Service Connection** window appears.

Figure 5-28 Remote Service Connection Window

7. In the **Local COM Port** drop-down list select a COM port.
8. Tap **OK**.

Personal Area Network Services

Connect two or more Bluetooth devices to share files, collaborate or play multi player games. To establish a Personal Area Network connection:

- Ensure the HMR is discoverable and connectable. See Bluetooth Settings *on page 88*.
- Discover and bond (pair) with the remote device. See Bonding with Discovered Device(s) *on page 83*.
- In **BTExplorer**, select the **Remote Devices** folder.
- Select the **Trusted Devices** folder.
- Tap the remote device folder.
- Tap and hold **Personal Area Network** and select **Connect** in the pop-up menu.

IrMC Synchronization Services

This service is only available WWAN configurations with OEM version 01.39.0001 and higher.

IrMC Synchronization is used to synchronize PIM contacts between a remote device and the HMR.

To establish an IrMC synchronization:

- Ensure the EDA is discoverable and connectable. See Bluetooth Settings *on page 88*.
- Discover and bond (pair) with the remote device. See Bonding with Discovered Device(s) *on page 83*.
- In **BTExplorer**, select the **Remote Devices** folder.
- Select the **Trusted Devices** folder.
- Tap the remote device folder.
- Tap and hold **IrMC Synchronization** and select **Connect** in the pop-up menu.

5.9 Bluetooth Settings

Use the **BTExplorer Settings** window to configure the operation of the **BTExplorer** application. Tap **Tools** > **Settings**. The **BTExplorer Settings** window appears.

Device Info Tab

Use the **Device Info** tab to configure the HMR's Bluetooth connection modes.

Figure 5-29 BTExplorer Settings – Device Info Tab

Device Name	Displays the name of the HMR.
Discoverable Mode	Allows you to set the HMR to be discoverable by other Bluetooth devices or not be discoverable. **Note:** For security reasons, the default is set to **Non Discoverable**.
Connectable Mode	Allows you to set the HMR to be connectable by other Bluetooth devices or not be connectable. **Note:** For security reasons, the default is set to **Non Connectable**.

Services Tab

For security reasons, by default services are not enabled.

Use the *Services* tab to add or delete Bluetooth services.

Figure 5-30 BTExplorer Settings – Services Tab

To add a service:

1. Tap **Add**. The **Add Local Service** window displays.

Figure 5-31 Add Local Service Window

2. In the list, select a service to add.
3. Tap **OK**. The **Edit Local Service** window displays for the selected service.
4. Select the appropriate information and then tap **OK**. See the following paragraphs for detailed information on the available services.

Dial-Up Networking Service

Dial-up Networking allows a dial-up modem to be accessed by other Bluetooth devices.

Figure 5-32 Add Local Service Window – Dial-Up

Service Name	Displays the name of the service.
Service Security	Select the type of security from the drop-down list; **None**, **Authenticate** or **Authenticate/Encrypt**.
Local COM Port	Select the COM port. Select COM1 to use a modem or other device that is connected to the connector on the bottom of the HMR.
Local Baud Rate	Select the communication baud rate.
Local Port Options	Select the port option.

File Transfer Service

File transfer allows files to be browsed by other Bluetooth devices.

Figure 5-33 File Transfer Information Window

Service Name	Displays the name of the service.
Service Security	Select the type of security from the drop-down list; **None**, **Authenticate** or **Authenticate/Encrypt**.
Root Directory	Select the directory that other Bluetooth devices can access.
File Permissions	Select the file permissions for the selected directory. Check the appropriate box to grant Read access, write access and delete access.

OBEX Object Push Service

OBEX Object Push allows contacts, business cards, pictures, appointments, and tasks to be pushed to the device by other Bluetooth devices.

Figure 5-34 OBEX Exchange Information Window

Service Name	Displays the name of the service.
Service Security	Select the type of security from the drop-down list; **None**, **Authenticate** or **Authenticate/Encrypt**.
Business Card	Send contact information to another mobile device.
Do not allow clients to push objects	Disables clients from pushing objects to the HMR.
Inbox Directory	Select a directory where another Bluetooth device can store files.

Personal Area Networking Service

Personal Area Networking hosts a Personal Area Network which allows communication with other Bluetooth devices.

Figure 5-35 Personal Area Networking Window

Service Name	Displays the name of the service
Service Security	Select the type of security from the drop-down list; **None**, **Authenticate** or **Authenticate/Encrypt**.
Support Group Ad-Hoc Networking	Select to enable Ad-Hoc networking.

Serial Port Service

Serial port allows COM ports to be accessed by other Bluetooth devices.

Figure 5-36 Serial Port Service Window

Service Name	Displays the name of the service
Service Security	Select the type of security from the drop-down list; **None**, **Authenticate** or **Authenticate/Encrypt**.
Local COM Port	Select the COM port. Select COM1 to use a modem or other device that is connected to the connector on the bottom of the HMR.
Local Baud Rate	Select the communication baud rate.
Local Port Options	Select the port option.

Headset Service

Serial port allows COM ports to be accessed by other Bluetooth devices.

Figure 5-37 Headset Service Window

Service Name Displays the name of the service.

IrMC Synchronization Service

This service is only available on WWAN configurations with OEM version 01.39.0001 and higher.

The IrMC Synchronization serviced used to synchronize PIM contacts between a remote device and the EDA.

Figure 5-38 IrMC Synchronization Service Window

Service Name	Displays the name of the service.
Service Security	Select the type of security from the drop-down list. Options are **None**, **Authenticate**, or **Authenticate/Encrypt**.
Phonebook	Select the **Phonebook** checkbox to allow synchronization with the EDA's contacts. Select **Read**, **Write**, **Create** and/or **Delete** to allow phonebook permissions.

Security Tab

To adjust the security settings for an individual service, select the **Services** tab first, then select the individual service, then **Properties**.

Figure 5-39 BTExplorer Settings – Security Tab

Use PIN Code (Incoming Connection)	Select for automatic use of the PIN code entered in the **PIN Code** text box. It is recommended not to use this automatic PIN code feature. See Security *on page 77* for more information.
PIN Code	Enter the PIN code.
Encrypt Link On All Outgoing Connections	Select to enable or disable encryption. Use encryption whenever possible.

Discovery Tab

Use the **Discovery** tab to set and modify discovered devices.

Figure 5-40 BTExplorer Settings – Discovery Tab

Inquiry Length	Sets the amount of time that the HMR takes to discover Bluetooth devices in the area.
Name Discovery Mode	Select either **Automatic** or **manual**.
Discovered Devices	Deletes all discovered devices and link keys.

Virtual COM Port Tab

Use the **Virtual COM Port** tab to select the COM ports for Bluetooth communication.

Figure 5-41 BTExplorer Settings – Virtual COM Port Tab

COM4:Bluetooth	Enable or disable COM Port 4.
COM5:Bluetooth	Enable or disable COM Port 5.
COM9:Bluetooth	Enable or disable COM Port 9.

If an application uses one of the COM ports assigned to Bluetooth, opening this port causes the Bluetooth stack to activate and guide you through the connection process.

Figure 5-42 COM Port Connection

Miscellaneous Tab

Figure 5-43 BTExplorer Settings – Miscellaneous Tab

Highlight Connections	Select the connection type to highlight when connected. In the Wizard Mode, the only option is **Favorites** or **None**. In the **Explorer Mode** the options are **None**, **Tree View Only**, **List View Only** or **Tree and List View**.
Apply Text Style	Select the text style to be applied to the connection text.
Apply Text Color	Select the text color to be applied to the connection text.

Chapter 6 Wireless Applications

6.1 Introduction

Wireless Local Area Networks (WLANs) allow HMRs to communicate wirelessly and send captured data to a host device in real time. The HMR supports the IEEE 802.11a, 802.11b and 802.11g standards. Before using the HMR on a WLAN, the facility must be set up with the required hardware to run the wireless LAN and the HMR must be configured. Refer to the documentation provided with the access points (APs) for instructions on setting up the hardware.

To configure the HMR, a set of wireless applications provide the tools to configure and test the wireless radio in the HMR. The **Wireless Application** menu on the task tray provides the following wireless applications:

1. Wireless Status
2. Wireless Diagnostics
3. Find WLANs
4. Manage Profiles
5. Options
6. Enable/Disable Radio
7. Log On/Off

Tap the Signal Strength icon to display the Wireless Applications menu.

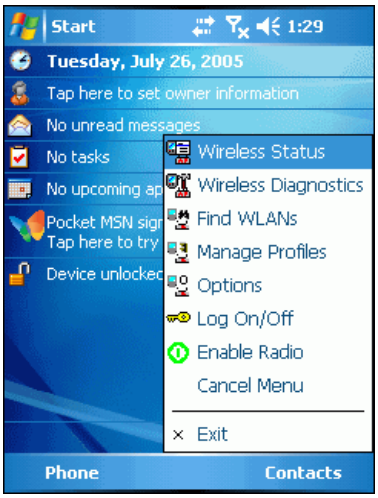


Figure 6-1 Wireless Applications Menu

6.2 Signal Strength Icon

The **Signal Strength** icon in the task tray indicates the HMR's wireless signal strength as follows:

Table 6-1 Wireless Application Icons, Signal Strength Descriptions

Icon	Status	Action
	Excellent signal strength	Wireless LAN network is ready to use.
	Very good signal strength	Wireless LAN network is ready to use.
	Good signal strength	Wireless LAN network is ready to use.
	Fair signal strength	Wireless LAN network is ready to use. Notify the network administrator that the signal strength is only "Fair".
	Poor signal strength	Wireless LAN network is ready to use. Performance may not be optimum. Notify the network administrator that the signal strength is "Poor".
	Out-of-network range (not associated)	No wireless LAN network connection. Notify the network administrator.
	No wireless LAN network card detected	No wireless LAN network card detected or radio disabled. Notify the network administrator.

6.3 Turning the WLAN Radio On and Off

To turn the WLAN radio off tap the **Signal Strength** icon and select **Disable Radio**.

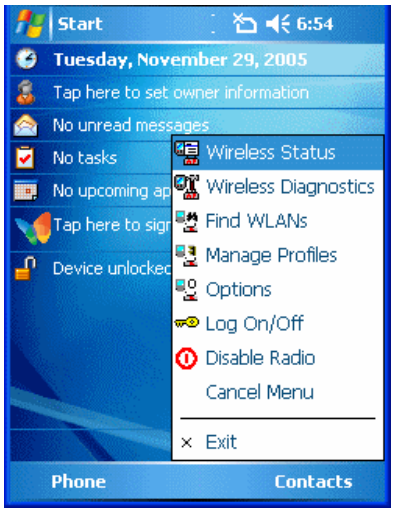


Figure 6-2 Disable Radio

To turn the WLAN radio on tap the **Signal Strength** icon and select **Enable Radio**.

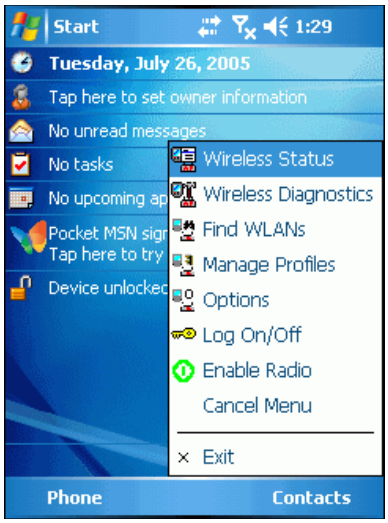


Figure 6-3 Enable Radio

For Windows Mobile 5.0 devices with AKU 2.2 and higher, the WLAN radio can also be turned on and off using the Wireless Manger. See Turning the Radios Off on page 21.

6.4 Find WLANs Application

Use the **Find WLANs** application to discover available networks in the vicinity of the user and HMR. To open the **Find WLANs** application, tap the **Signal Strength** icon > **Find WLANs**. The **Find WLANs** window displays.

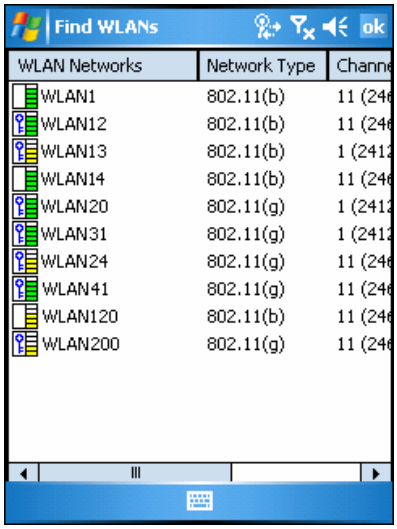


Figure 6-4 Find WLANs Window

The Find WLANs display is limited to 32 items (ESSIDs or MAC addresses). A combination of up to 32 ESSIDs/APs may be displayed.

Manually enter valid ESSIDs not displayed in the Find WLANs window. See **Figure 6-4** on page **103**.

The *Find WLANs* list displays:

1. WLAN Networks – Available wireless networks with icons that indicate signal strength and encryption type. The signal strength and encryption icons are described in Table 6-2 and Table 6-3.
2. Network Type – Type of network.

3. Channel – Channel on which the AP is transmitting.
4. Signal Strength – The signal strength of the signal from the AP.

Table 6-2 Signal Strength Icon

Icon	Description
	Excellent signal Very good signal Good signal Fair signal Poor signal Out of range or no signal

Table 6-3 Encryption Icon

Icon	Description
	No encryption. WLAN is an infrastructure network. WLAN is an Ad-Hoc network. WLAN access is encrypted and requires a password.

Tap-and-hold on a WLAN network to open a pop-up menu which provides two options: **Connect** and **Refresh**. Select **Refresh** to refresh the WLAN list. Select **Connect** to create a wireless profile from that network. This starts the **Profile Editor Wizard** which allows you to set the values for the selected network. After editing the profile, the HMR automatically connects to this new profile.

6.5 Profile Editor Wizard

Use the **Profile Editor Wizard** to create a new profile or edit an existing profile. If editing a profile, the fields reflect the current settings for that profile. If creating a new profile, the known information for that WLAN network appears in the fields.

Navigate through the wizard using the **Next** and **Back** buttons. Tap **X** to quit. On the confirmation dialog box, tap **No** to return to the wizard or tap **Yes** to quit and return to the *Manage Profiles* window. See Manage Profiles Application on page 121 for instructions on navigating the **Profile Editor Wizard**.

Profile ID

In the **Profile ID** dialog box in the **Profile Editor Wizard**, enter the profile name and the ESSID.

Figure 6-5 Profile ID Dialog Box

Table 6-4 Profile ID Fields

Field	Description
Name	The name and (WLAN) identifier of the network connection. Enter a user friendly name for the HMR profile used to connect to either an AP or another networked computer. Example: The Public LAN.
ESSID	The ESSID is the 802.11 extended service set identifier. The ESSID is 32-character (maximum) string identifying the WLAN, and must match the AP ESSID for the HMR to communicate with the AP.

Two profiles with the same user friendly name are acceptable but not recommended.

Tap **Next.** The *Operating Mode* dialog box displays.

Operating Mode

Use the **Operating Mode** dialog box to select the operating mode (Infrastructure or Ad-Hoc) and the country location.

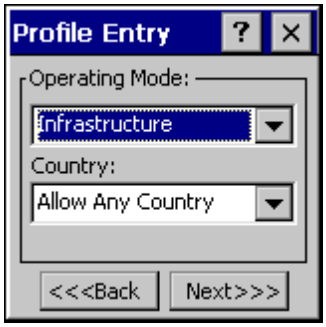


Figure 6-6 Operating Mode Dialog Box

Table 6-5 Operating Mode Fields

Field	Description
Operating Mode	Select **Infrastructure** to enable the HMR to transmit and receive data with an AP. Infrastructure is the default mode. Select **Ad Hoc** to enable the HMR to form its own local network where HMRs communicate peer-to-peer without APs using a shared ESSID.
Country	**Country** determines if the profile is valid for the country of operation. The profile country must match the country in the options page or it must match the acquired country if 802.11d is enabled. **Single Country Use:** When the device is only used in a single country, set every profile country to **Allow Any Country**. In the **Options** > **Regulatory** dialog box (see Figure 6-46 on page 135), select the specific country the device is used in, and deselect the **Enable 802.11d** option. This is the most common and efficient configuration, eliminating the initialization overhead associated with acquiring a country via 802.11d. **Multiple Country Use:** When the device is used in more than one country, select the **Enable 802.11d** option in the **Options** > **Regulatory** dialog box (see Figure 6-46 on page 135). This eliminates the need for reprogramming the country (in **Options** > **Regulatory**) each time you enter a new country. However, this only works if the infrastructure (i.e., APs) supports 802.11d (some infrastructures do not support 802.11d, including some Cisco APs). When the Enable 802.11d option is selected, the **Options**

> **Regulatory** > **Country** setting is not used. For a single profile that can be used in multiple countries, with infrastructure that supports 802.11d (including Symbol infrastructure), set the Profile Country to **Allow Any Country**. Under **Options** > **Regulatory**, select **Enable 802.11d**. The **Options** > **Regulatory** > **Country** setting is not used.
>
> For a single profile that can be used in multiple countries, but with infrastructure that does not support 802.11d, set the profile country to **Allow Any Country,** and de-select (uncheck) **Enable 802.11d**. In this case, the **Options** > **Regulatory** > **Country** setting must always be set to the country the device is currently in. This configuration option is the most efficient and may be chosen for use with any infrastructure. However, the **Options** > **Regulatory** > **Country** setting must be manually changed when a new country is entered. Note that using a single profile in multiple countries implies that there is a common ESSID to connect to in each country. This is less likely than having unique ESSIDs in each country, this requires unique profiles for each country.
>
> For additional efficiency when using multiple profiles that can be used in multiple countries, the country setting for each profile can be set to a specific country. If the current country (found via 802.11d or set by **Options** > **Regulatory** > **Country** when 802.11d is disabled) does not match the country set in a given profile, then that profile is disabled. This can make profile roaming occur faster. For example, if two profiles are created and configured for Japan, and two more profiles are created and configured for USA, then when in Japan only the first two profiles are active, and when in USA only the last two are active. If they had all been configured for **Allow Any Country**, then all four would always be active, making profile roaming less efficient.

Tap **Next**. If **Ad-Hoc** mode was selected the **Ad-Hoc** dialog box displays. If **Infrastructure** mode was selected the **Authentication** dialog box displays. See Authentication on page 107 for instruction on setting up authentication.

Ad-Hoc

Use the **Ad-Hoc** dialog box to select the required information to control **Ad-Hoc** mode. This dialog box does not appear if you selected **Infrastructure** mode. To select Ad-Hoc mode:

1. Select a channel number from the **Channel** drop-down list.

Table 6-6 Ad-Hoc Channels

Band	Channel	Frequency
2.4 GHz	1	2412 MHz
	2	2417 MHz
	3	2422 MHz
	4	2427 MHz
	5	2432 MHz
	6	2437 MHz
	7	2442 MHz
	8	2447 MHz
	9	2452 MHz
	10	2457 MHz
	11	2462 MHz
5 GHz	36	5180 MHz
	40	5200 MHz
	44	5220 MHz

48	5240 MHz

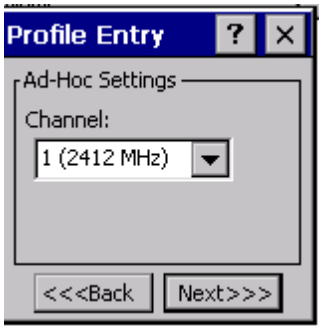


Figure 6-7 Ad-Hoc Settings Dialog Box

2. Tap **Next**. The **Encryption** dialog box displays. See Encryption on page 114 for encryption options.

Authentication

Use the **Authentication** dialog box to configure authentication. If you selected **Ad-Hoc** mode, this dialog box is not available and authentication is set to **None** by default.

Select an authentication type from the drop-down list and tap **Next**. Selecting **PEAP** or **TTLS** displays the **Tunneled** dialog box. Selecting **None**, **TLS**, or **LEAP** displays the **Encryption** dialog box. See Encryption on page 114 for encryption options. Table 6-7 lists the available authentication options.

Figure 6-8 Authentication Dialog Box

Table 6-7 Authentication Options

Authentication	Description
None	Default setting when authentication is not required on the network.
EAP-TLS	Select this option to enable EAP-TLS authentication. EAP-TLS is an authentication scheme through IEEE 802.1x. It authenticates users and ensures only valid users can connect to the network. It also restricts unauthorized users from accessing transmitted information by using secure authentication certificates.
PEAP	Select this option to enable PEAP authentication. This method uses a digital certificate to verify and authenticate a user's identity.
LEAP	Select this option to enable LEAP authentication, which is based on mutual authentication. The AP and the connecting HMR require authentication before gaining access to the network.
TTLS	Select this option to enable TTLS authentication.

Tunneled Authentication

Use the **Tunneled Authentication** dialog box to select the tunneled authentication options. There are different selections available for PEAP or TTLS authentication.

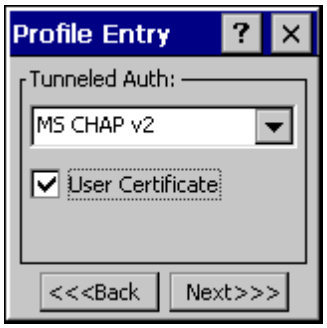


Figure 6-9 Tunneled Authentication Dialog Box

To select a tunneled authentication type:

- Select a tunneled authentication type from the drop-down list. See Table 6-8 and Table 6-9.
- Select the **User Certificate** check box if a certificate is required. If you selected the TLS tunnel type that requires a user certificate, the check box is already selected.
- Tap **Next**. The **Installed User Certificates** dialog box appears.

Table 6-8 lists the PEAP tunneled authentication options.

Table 6-8 PEAP Tunneled Authentication Options

PEAP Tunneled Authentication	Description
MS CHAP v2	Microsoft Challenge Handshake Authentication Protocol version 2 (MS CHAP v2) is a password-based, challenge-response, mutual authentication protocol that uses the industry-standard Message Digest 4 (MD4) and Data Encryption Standard (DES) algorithms to encrypt responses. The authenticating server challenges the access client and the access client challenges the authenticating server. If either challenge is not correctly answered, the connection is rejected. MS CHAP v2 was originally designed by Microsoft as a PPP authentication protocol to provide better protection for dial-up and virtual private network (VPN) connections. With Windows XP SP1, Windows XP SP2, Windows Server 2003, and Windows 2000 SP4, MS CHAP v2 is also an EAP type.
TLS	EAP TLS is used during phase 2 of the authentication process. This method uses a user certificate to authenticate.

Table 6-9 lists the TTLS tunneled authentication options.

Table 6-9 TTLS Tunneled Authentication Options

TTLS Tunneled Authentication	Description
CHAP	Challenge Handshake Authentication Protocol (CHAP) is one of the two main authentication protocols used to verify the user name and password for PPP Internet connections.

	CHAP is more secure than PAP because it performs a three way handshake during the initial link establishment between the home and remote machines. It can also repeat the authentication anytime after the link is established.
MS CHAP	Microsoft Challenge Handshake Authentication Protocol (MS CHAP) is an implementation of the CHAP protocol that Microsoft created to authenticate remote Windows workstations. MS CHAP is identical to CHAP, except that MS CHAP is based on the encryption and hashing algorithms used by Windows networks, and the MS CHAP response to a challenge is in a format optimized for compatibility with Windows operating systems.
MS CHAP v2	MS CHAP v2 is a password based, challenge response, mutual authentication protocol that uses the industry standard Message Digest 4 (MD4) and Data Encryption Standard (DES) algorithms to encrypt responses. The authenticating server challenges the access client and the access client challenges the authenticating server. If either challenge is not correctly answered, the connection is rejected. MS CHAP v2 was originally designed by Microsoft as a PPP authentication protocol to provide better protection for dial-up and virtual private network (VPN) connections. With Windows XP SP1, Windows XP SP2, Windows Server 2003, and Windows 2000 SP4, MS CHAP v2 is also an EAP type.
PAP	Password Authentication Protocol (PAP) has two variations: PAP and CHAP PAP. It verifies a user name and password for PPP Internet connections, but it is not as secure as CHAP, since it works only to establish the initial link. PAP is also more vulnerable to attack because it sends authentication packets throughout the network. Nevertheless, PAP is more commonly used than CHAP to log in to a remote host like an Internet service provider.
MD5	Message Digest-5 (MD5) is an authentication algorithm developed by RSA. MD5 generates a 128-bit message digest using a 128-bit key, IPSec truncates the message digest to 96 bits.

User Certificate Selection

If you checked the **User Certificate** check box on the **Tunneled Authentication** dialog box or if **TLS** is the selected authentication type, the **Installed User Certificates** dialog box displays. Select a certificate from the drop-down list of currently installed certificates before proceeding. The selected certificate's name appears in the drop-down list. If the required certificate is not in the list, install it.

Figure 6-10 Installed User Certificates Dialog Box

User Certificate Installation

To install a user certificate (EAP TLS only) and a server certificate for EAP TLS and PEAP authentication:

1. Tap Install Certificate. The Credentials dialog box appears.

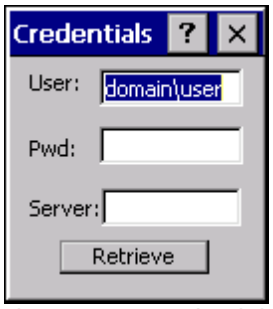


Figure 6-11 Credentials Dialog Box

2. Enter the **User:**, **Pwd:** (password), and **Server:** information in their respective text boxes.
3. Tap **Retrieve**. A **Progress** dialog indicates the status of the certificate retrieval.
4. Tap **ok** to exit.

After the installation completes, the **Installed User Certs** dialog box displays and the certificate is available in the drop-sown for selection.

To successfully install a user certificate, the HMR must already be connected to a network from which the server is accessible.

Server Certificate Selection

If you select the **Validate Server Certificate** check box, a server certificate is required. Select a certificate on the **Installed Server Certificates** dialog box. An hour glass may appear as the wizard populates the existing certificate list. If the required certificate is not listed, install it:

1. Tap the Install Certificate button.

Figure 6-12 Installed Server Certificates Dialog Box

A dialog box appears that lists the currently loaded certificate files found in the default directory with the default extension.

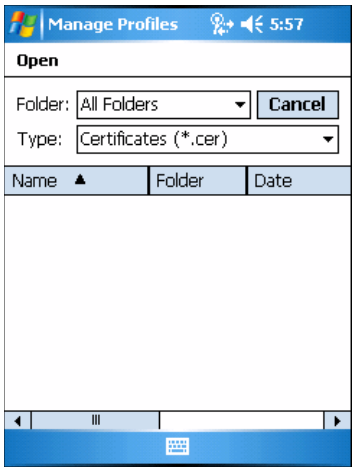


Figure 6-13 Browse Server Certificates

2. Locate a certificate. Select a different folder, if applicable, using the **Folder** drop-down list. Tap the certificate filename. The certificate installs automatically.
3. A confirmation dialog verifies the installation. If the information in this dialog is correct, tap the **Yes** button, If the information in this dialog is not correct tap the **No** button. The wizard returns to the **Installed Server Certs** dialog box.

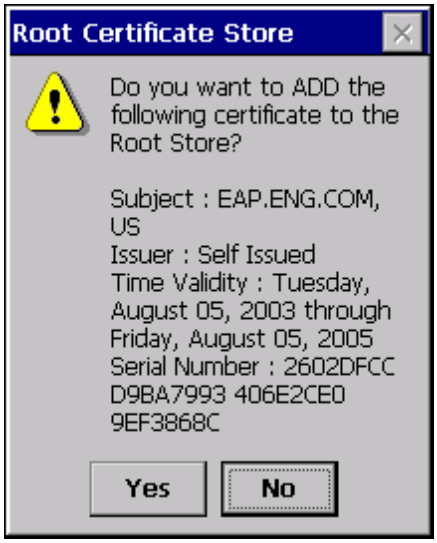


Figure 6-14 Confirmation Dialog Box

Credential Cache Options

If you selected any of the password-based authentication types, you can select different credential caching options. These options specify when the network credential prompts appear: at connection, on each resume, or at a specified time.

Entering the credentials directly into the profile permanently caches the credentials. In this case, the HMR does not require user login. If a profile does not contain credentials entered through the configuration editor, you must log in to the HMR before connecting.

Caching options only apply on credentials entered through the login dialog box.

Figure 6-15 Prompt for Login at Dialog Box

If the HMR does not have the credentials, you are prompted to enter a username and password. If the HMR has the credentials (previous entered via a login dialog box), it uses these credentials unless the caching options require the HMR to prompt for new credentials. If you entered the credentials via the profile, the HMR does not prompt for new credentials. Table 6-10 lists the caching options.

Table 6-10 Cache Options

	Description
At Connect	Select this option to prompt for credentials whenever the WCS tries to connect to a new profile. Deselect this to use the cached credentials to authenticate. If the credentials are not cached, you are prompted to enter credentials. This option only applies when logged in.
On Resume	Selecting this reauthenticates an authenticated user when a suspend/resume occurs. Once reauthenticated, the user is prompted for credentials. If the user does not enter the same credentials that were entered prior to the suspend/resume within three attempts, the user is disconnected from the network. This option only applies when logged in.
At Time	Select this option to perform a local verification on an authenticated user at a specified time. The time can be an absolute time or a relative time from the authentication, and should be in at least 5 minute intervals. Once the time has passed, the user is prompted for credentials. If the user does not enter the correct credentials within three attempts, the user is disconnected from the network. This option only applies when logged in.

Entering credentials applies these credentials to a particular profile. Logging out clears all cached credentials. Editing a profile clears all cached credentials for that profile.

The following authentication types have credential caching:

1. EAP TLS
2. PEAP
3. LEAP
4. TTLS

Select the **At Time** check box displays the **Time Cache Options** dialog box.

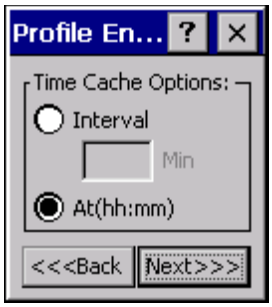


Figure 6-16 Time Cache Options Dialog Box

- Tap the **Interval** radio button to check credentials at a set time interval.
- Enter the value in minutes in the **Min** box.
- Tap the **At (hh:mm)** radio button to check credentials at a set time.
- Tap **Next**. The **At Time** dialog box appears.

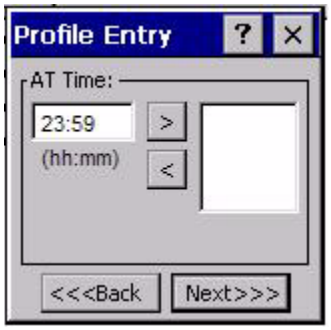


Figure 6-17 At Time Dialog Box

- Enter the time using the 24 hour clock format in the **(hh:mm)** box.
- Tap **>** to move the time to the right. Repeat for additional time periods.
- Tap **Next**. The **User Name** dialog box displays.

User Name

The user name and password can be entered (but is not required) when the profile is created. When a profile authenticates with credentials that were entered in the profile, caching rules do not apply. Caching rules only apply on credentials that are entered through the login dialog box.

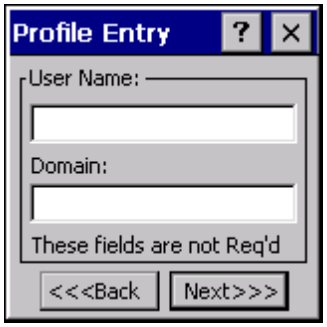


Figure 6-18 Username Dialog Box

Password

Use the **Password** dialog box to enter a password. If EAP/TLS is the selected authentication type, the password is not required and the field is disabled.

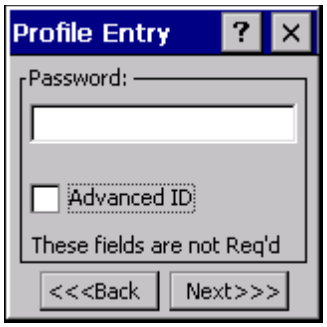


Figure 6-19 Password Dialog Box

1. Enter a password in the **Password** field.
2. Select the **Advanced ID** check box, if advanced identification is required.
3. Tap **Next.** The **Encryption** dialog box displays. See Encryption on page 114.

Advanced Identity

Use the **Advanced ID** dialog box to enter the 802.1X identity to supply to the authenticator. This value can be 63 characters long and is case sensitive. In TTLS and PEAP, it is recommended entering the identity *anonymous* (rather than a true identity) plus any desired realm (e.g., anonymous@myrealm). A user ID is required before proceeding.

When authenticating with a Microsoft IAS server, do not use advanced identity.

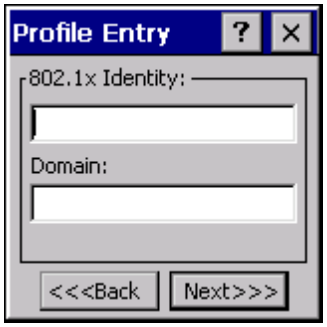


Figure 6-20 Advanced Identity Dialog Box

Tap **Next**. The **Encryption** dialog box displays.

Encryption

Use the **Encryption** dialog box to select an encryption type. The drop-down list includes encryption types available for the selected authentication type. See Table 6-12 for these encryption types.

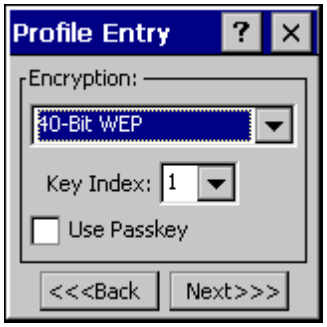


Figure 6-21 Encryption Dialog Box

Table 6-11 Encryption Options

Encryption	Description
Open	Select *Open* (the default) when no data packet encryption is needed over the network. Selecting this option provides no security for data transmitting over the network.
40-Bit WEP	Select 40-Bit WEP to use 40-bit key length WEP encryption. WEP keys are manually entered in the edit boxes. Only the required number of edit boxes for a key length is displayed (10 Hex digit value for 40-bit keys). Use the *Key Index* drop-down list to configure the four WEP keys. The adapter uses the selected key. Note: The default Hex digit keys are visible any time they are used. As a security precaution after setting the key values for the network, the digits are replaced with asterisks * in the encryption key fields. If the associated AP uses an optional passkey, the active adapter WLAN profile must use one as well. The passkey is a plain text representation of the WEP keys displayed in the encryption dialog box. The passkey provides an easy way to enter WEP key data without having to remember the entire 40-bit (10 character) Hex digit string.
128-Bit WEP	Select 128-Bit WEP to use 128-bit key length WEP encryption. WEP keys are manually entered in the edit boxes. Only the required number of edit boxes for a key length is displayed (26 Hex digit value for 128-bit keys). Use the *Key Index* drop-down list to configure the four WEP keys. The adapter uses the selected key. Note: The default Hex digit keys are visible any time they are used. As a security precaution after setting the key values for the network, the digits are replaced with asterisks * in the encryption key fields. If the associated AP uses an optional passkey, the active adapter WLAN profile must use one as well. The passkey is a plain text representation of the WEP keys displayed in the encryption dialog box. The passkey provides an easy way to enter WEP key data without having to remember the entire 128-bit (26 character) Hex digit string.
TKIP	Select this option to use Wireless Protected Access (WPA) via TKIP. Manually enter the shared keys in the

AES (Fusion 2.5 only)	passkey field. Tap **Next** to display the passkey dialog box. Enter an 8 to 63 character string. Select this option to use Advanced Encryption Standard (AES). Manually enter the shared keys in the passkey field. Tap **Next** to display the passkey dialog box. Enter an 8 to 63 character string.

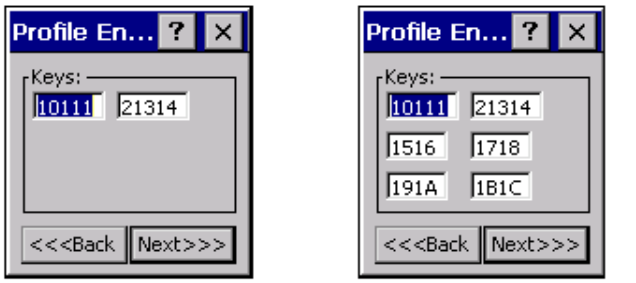
Table 6-12 Encryption / Authentication Matrix

Authentication	Encryption			
	Open	WEP	TKIP	AES (Fusion 2.5 only)
None	Yes	Yes	Yes	Yes
EAP TLS	No	Yes	Yes	Yes
PEAP	No	Yes	Yes	Yes
LEAP	No	Yes	Yes	Yes
TTLS	No	Yes	Yes	Yes

Key Entry Page

If you select either **40-Bit WEP** or **128-Bit WEP** the wizard proceeds to the key entry dialog box unless the **Use Passkey** check box was selected in the **Encryption** dialog box (see Figure 6-21 on page 114). The **Key Entry** dialog box will be shown only if the authentication is set to **None**. To enter the key information:

- Enter the 40-bit or 128-bit keys into the fields.
- Tap **Next**.



40-Bit WEP Keys Dialog Box 128-Bit WEP Keys Dialog Box

Figure 6-22 40-Bit and 128-Bit WEP Keys Dialog Boxes

Passkey Dialog

When you select **None** as an authentication and **WEP** as an encryption, you can choose to enter a passkey by checking the **Use PassKey** check box. The user is prompted to enter the passkey. For WEP, the **Use PassKey** checkbox is only available if the authentication is **None**.

When you select **None** as an authentication and **TKIP** as an encryption, you must enter a passkey. The user cannot enter a passkey if the encryption is **TKIP** and the authentication is anything other than **None**.

When you select **None** as an authentication and **AES** as an encryption, you must enter a passkey. The user cannot enter a passkey if the encryption is **AES** and the authentication is anything other than **None**.

Figure 6-23 Passkey Dialog Box

Tap **Next**. The **IP Address Entry** dialog box displays.

IP Address Entry

Use the **IP Address Entry** dialog box to configure network address parameters: IP address, subnet, gateway, DNS, and WINS.

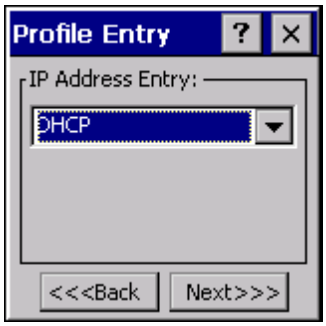


Figure 6-24 IP Address Entry Dialog Box

Table 6-13 IP Address Entry

Encryption	Description
DHCP	Select Dynamic Host Configuration Protocol (**DHCP**) from the **IP Address Entry** drop-down list to obtain a leased IP address and network configuration information from a remote server. DHCP is the default setting for the HMR profile. When DHCP is selected, the IP address fields are read-only.
Static	Select **Static** to manually assign the IP, subnet mask, default gateway, DNS, and WINS addresses the HMR profile uses.

Select either DHCP or Static from the drop-down list and tap Next. Selecting Static IP displays the IP Address Entry dialog box. Selecting DHCP displays the Transmit Power dialog box.

Use the IP Address Entry dialog box to enter the IP address and subnet information.

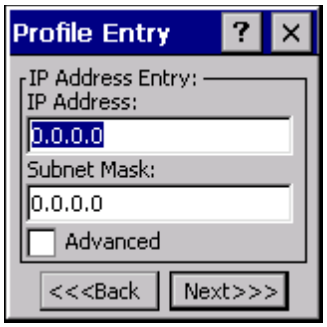


Figure 6-25 Static IP Address Entry Dialog Box

Table 6-14 Static IP Address Entry Fields

Field	Description
IP Address	The Internet is a collection of networks with users that communicate with each other. Each communication carries the address of the source and destination networks and the particular machine within the network associated with the user or host computer at each end. This address is called the IP address (Internet Protocol address). Each node on the IP network must be assigned a unique IP address that is made up of a network identifier and a host identifier. Enter the IP address as a dotted-decimal notation with the decimal value of each octet separated by a period, for example, 192.168.7.27.
Subnet Mask	Most TCP/IP networks use subnets to manage routed IP addresses. Dividing an organization's network into subnets allows it to connect to the Internet with a single shared network address, for example, 255.255.255.0.

Select the **Advanced** check box, then tap **NEXT** to display the **Advanced Address Entry** dialog box. Enter the Gateway, DNS, and WINS address. Tap **NEXT** without selecting the **Advanced** check box to display the **Transmit Power** dialog box.

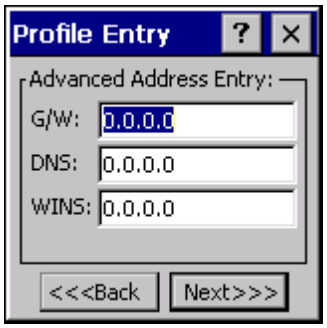


Figure 6-26 Advanced Address Entry Dialog Box

The IP information entered in the profile is only used if you selected the **Enable IP Mgmt** check box in the **Options** > **System Options** dialog box (System Options on page 136). If you didn't select this, the IP information in the profile is ignored and the IP information entered in the Microsoft interface applies.

Table 6-15 IP Config Advanced Address Entry Fields

Field	Description
G/W	The default gateway forwards IP packets to and from a remote destination.
DNS	The Domain Name System (DNS) is a distributed Internet directory service. DNS translates domain names and IP addresses, and controls Internet email delivery. Most Internet services require DNS to operate properly. If

	DNS is not configured, Web sites cannot be located and/or email delivery fails.
WINS	WINS is a Microsoft® Net BIOS name server. WINS eliminates the broadcasts needed to resolve computer names to IP addresses by providing a cache or database of translations.

Tap **Next**. The **Transmit Power** dialog box displays.

Transmit Power

The **Transmit Power** drop-down list contains different options for Ad-Hoc and Infrastructure mode. Automatic (i.e., use the current AP settings) and Power Plus (use higher than the current AP settings) are available for **Infrastructure** mode.

Adjusting the radio transmission power level enables the user to expand or confine the transmission area with respect to other wireless devices that could be operating nearby. Reducing coverage in high traffic areas improves transmission quality by reducing the amount of interference in that coverage area.

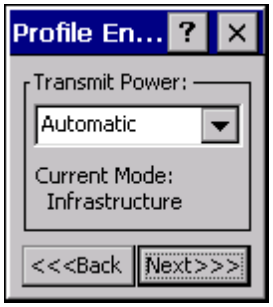


Figure 6-27 Transmit Power Dialog Box (Infrastructure Mode)

Table 6-16 Transmit Power Dialog Box (Infrastructure Mode)

Field	Description
Automatic Power Plus	Select **Automatic** (the default) to use the AP power level. Select **Power Plus** to set the HMR transmission power one level higher than the level set for the AP.

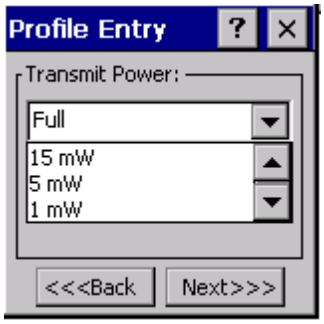


Figure 6-28 Transmit Power Dialog Box (Ad-Hoc Mode)

Table 6-17 Power Transmit Options (Ad-Hoc Mode)

Field	Description
Full	Select **Full** power for the highest transmission power level. Select **Full** power when operating in highly reflective environments and areas where other devices could be operating nearby, or

	when attempting to communicate with devices at the outer edge of a coverage area.
30 mW	Select **30 mW** to set the transmit power level to 30 mW.
15 mW	Select **15 mW** to set the transmit power level to 15 mW.
5 mW	Select **5 mW** to set the transmit power level to 5 mW.
1 mW	Select **1 mW** for the lowest transmission power level. Use this level when communicating with other devices in very close proximity, or in instances where you expect little or no radio interference from other devices.

Tap **Next** to display the **Battery Usage** dialog box.

Battery Usage

Use the **Battery Usage** dialog box to select power consumption of the wireless LAN. There are three settings available: CAM, Fast Power Save, and MAX Power Save. Battery usage cannot be configured in Ad-Hoc profiles.

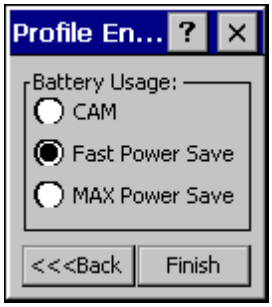


Figure 6-29 Battery Usage Dialog Box

Power consumption is also related to the transmit power settings.

Table 6-18 Battery Usage Options

Field	Description
CAM	Continuous Aware Mode (**CAM**) provides the best network performance, but yields the shortest battery life.
Fast Power Save	**Fast Power Save** (the default) performs in the middle of CAM and MAX Power Save with respect to network performance and battery life.
Max Power Save	**Max Power Save** yields the longest battery life while potentially reducing network performance. In networks with minimal latency, Max Power Save performs as well as Fast Power Save, but with increased battery conservation.

Manage Profiles Application

The **Manage Profiles** window provides a list of user-configured wireless profiles. Define up to 32 profiles at any one time. To open the **Manage Profiles** window, tap the **Signal Strength** icon > **Manage Profiles**.

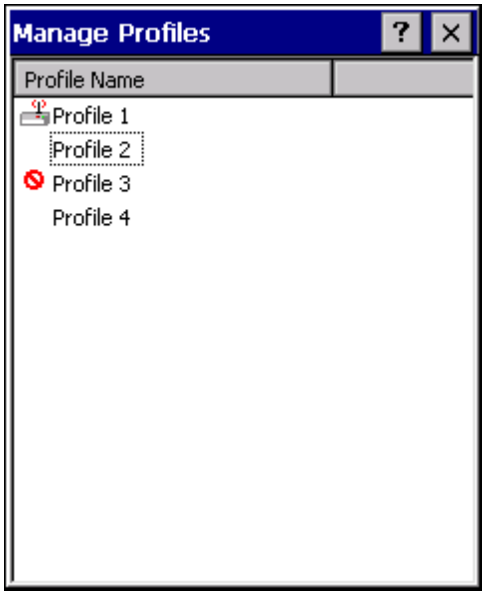


Figure 6-30 Manage Profiles Window

Icons next to each profile identify the profile's current state.

Table 6-19 Profile Icons

Icon	Description
No Icon	Profile is not selected, but enabled.
	Profile is disabled.
	Profile is cancelled. A cancelled profile is disabled until a connect or login function is performed through the configuration editor.
	Profile is in use and describes an infrastructure profile not using encryption.
	Profile is in use and describes an infrastructure profile using encryption.
	Profile is in use and describes an ad-hoc profile not using encryption.
	Profile is in use and describes an ad-hoc profile using encryption.
	Profile is not valid in the device current operating regulatory domain.

The profiles are listed in priority order for use by the automatic roaming feature. Change the order by moving profiles up or down. To edit existing profiles, tap and hold one in the list and select an option from the menu to connect, edit, disable (enable), or delete the profile. (Note that the *Disable* menu item changes to *Enable* if the profile is already disabled.)

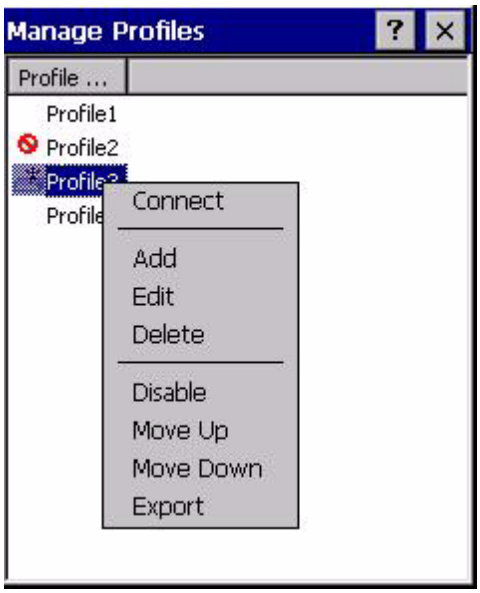


Figure 6-31 Manage Profiles Context Menu

Changing Profiles

A completed profile is a set of configuration settings that can be used in different locations to connect to a wireless network. Create different profiles to have pre-defined operating parameters available for use in various network environments. When the **WLAN Profiles** window displays, existing profiles appear in the list.

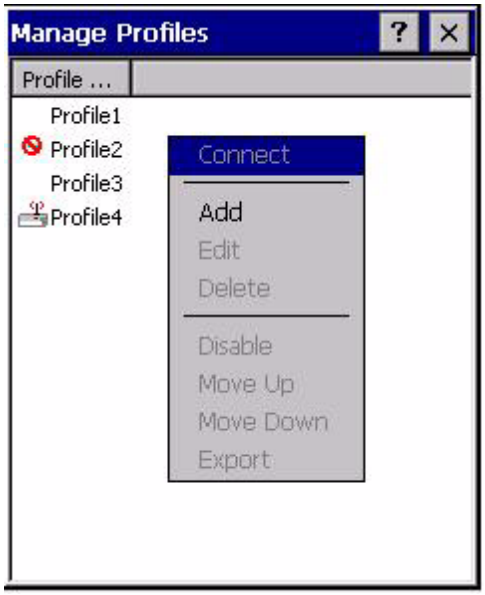


Figure 6-32 Manage Profiles

Tap and hold a profile and select **Connect** from the pop-up menu to set this as the active profile. Once selected, the HMR uses the authentication, encryption, ESSID, IP Config, and power consumption settings configured for that profile.

Editing a Profile

Tap and hold a profile and select **Edit** from the pop-up menu to display the **Profile Wizard** where you can set the ESSID and operating mode for the profile. Use the **Profile**

Wizard to edit the profile power consumption and security parameters. See Profile Editor Wizard on page 104.

Creating a New Profile

To create new profiles from the **Manage Profiles** window, tap-and-hold anywhere in this window:

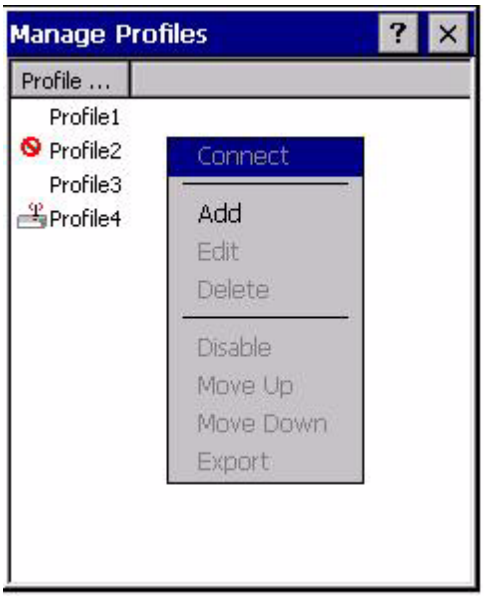


Figure 6-33 Manage Profiles – Add

Select **Add** to display the **Profile Wizard** wherein you can set the profile name and ESSID. Set security, network address information, and power consumption level for the new profile.

Deleting a Profile

To delete a profile from the list, tap and hold and select **Delete** from the pop-up menu. A confirmation dialog box appears.

Ordering Profiles

Tap and hold a profile from the list and select **Move Up or Move Down** to order the profile. If the current profile association is lost, the HMR attempts to associate with the first profile in the list, then the next, until it achieves a new association.

Profile Roaming must be enabled.

Export a Profile

To export a profile to a registry file, tap and hold a profile from the list and select **Export** from the pop-up menu. The **Save As** dialog box displays with the **Application** folder and a default name of WCS_PROFILE{*profile GUID*}.reg (Globally Unique Identifier).

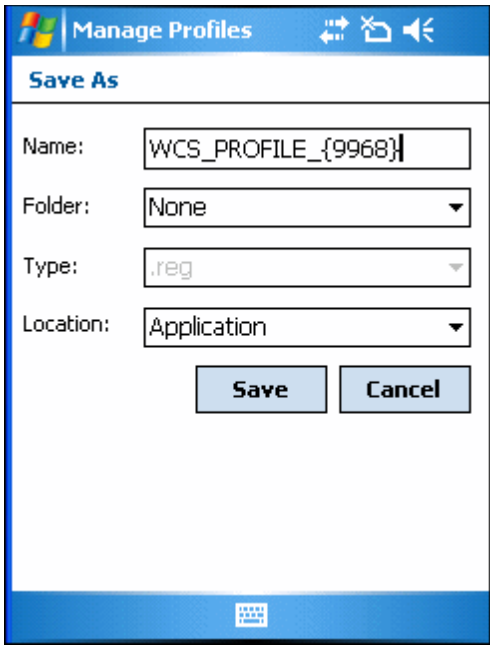


Figure 6-34 Save As Dialog Box

If required, change the name in the **Name** field and tap **Save**. A confirmation dialog box appears after the export completes.

6.6 Wireless Status Application

To open the **Wireless Status** window, tap the **Signal Strength** icon > **Wireless Status**. The **Wireless Status** window displays information about the wireless connection.

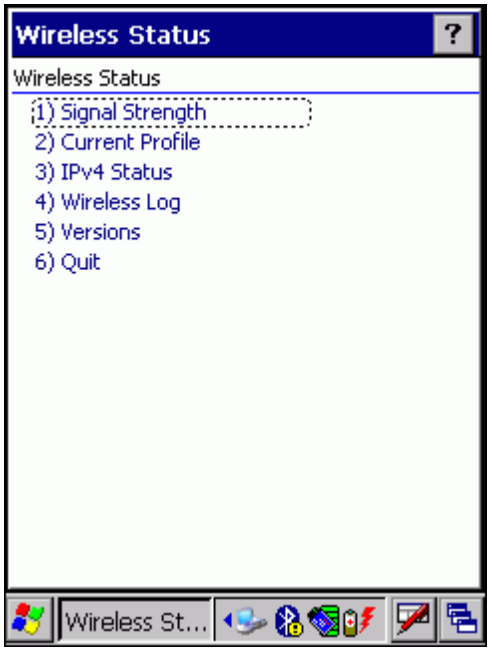


Figure 6-35 Wireless Status Window

The **Wireless Status** window contains the following options. Tap the option to display the option window.

- Signal Strength - provides information about the connection status of the current wireless profile.

- Current Profile - displays basic information about the current profile and connection settings.
- IPv4 Status - displays the current IP address, subnet, and other IP related information assigned to the HMR.
- Wireless Log - displays a log of important recent activity, such as authentication, association, and DHCP renewal completion, in time order.
- Versions - displays software, firmware, and hardware version numbers.
- Quit - exits the **Wireless Status** window.

Option windows contain a back button  to return to the main **Wireless Status** window.

Signal Strength Window

The **Signal Strength** window provides information about the connection status of the current wireless profile including signal quality, missed beacons, and transmit retry statistics. The BSSID address (shown as *AP MAC Address*) displays the AP currently associated with the connection. In Ad-Hoc mode, the AP MAC Address shows the BSSID of the Ad-Hoc network. Information in this window updates every 2 seconds.

To open the **Signal Status** window, tap **Signal Strength** in the **Wireless Status** window.

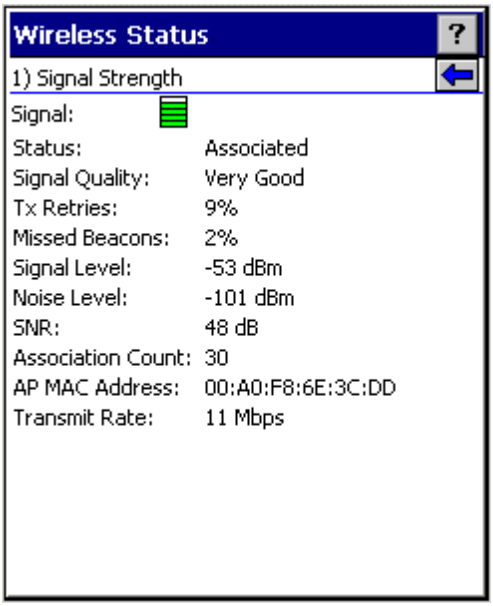


Figure 6-36 Signal Strength Window

After viewing the **Signal Strength** window, tap the back button to return to the **Wireless Status** window.

Table 6-20 Signal Strength Status

Field	Description
Signal	Displays the Relative Signal Strength Indicator (RSSI) of the signal transmitted between the AP and HMR. As long as the Signal Quality icon is green the AP association is not jeopardized. If the icon is red (poor signal), an association with a different AP could be warranted to improve the signal. The signal strength icon changes depending on the signal strength.  Excellent Signal  Very Good Signal  Good Signal  Fair Signal  Poor Signal  Out of Range (no signal)  The radio card is off or there is a problem communicating with the radio card.
Status	Indicates if the HMR is associated with the AP.
Signal Quality	Displays a text format of the Signal icon.
Tx Retries	Displays a percentage of the number of data packets the HMR retransmits. The fewer transmit retries, the more efficient the wireless network is.
Missed Beacons	Displays a percentage of the amount of beacons the HMR missed. The fewer transmit retries, the more efficient the wireless network is. Beacons are uniform system packets broadcast by the AP to keep the network synchronized.
Signal Level	The AP signal level in decibels per milliwatt (dBm).
Noise Level	The background interference (noise) level in decibels per milliwatt (dBm).
SNR	The access point/HMR Signal to Noise Ratio (SNR) of signal strength to noise (interference) in decibels per milliwatt (dBm).
Association Count	Displays the number of APs the HMR connects to while roaming.
AP MAC Address	Displays the MAC address of the AP to which the HMR is connected.
Transmit Rate	Displays the current rate of the data transmission.

Current Profile Window

The **Current Profile** window displays basic information about the current profile and connection settings. This window updates every two seconds.

To open the Current Profile window, tap Current Profile in the Wireless Status window.

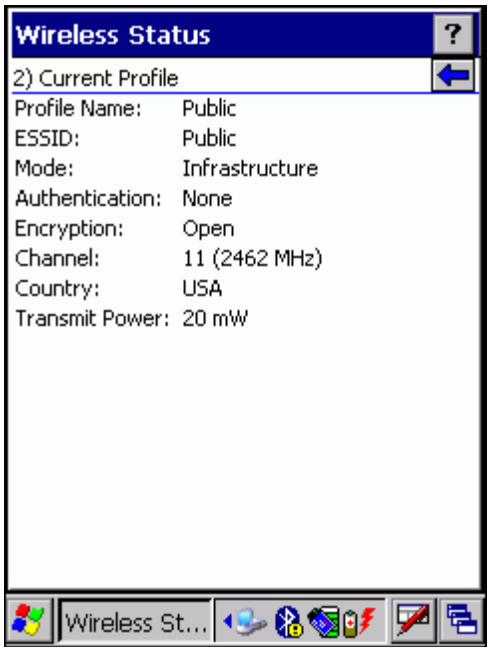


Figure 6-37 Current Profile Window

Table 6-21 Current Profile Window

Field	Description
Profile Name	Displays the current profile name the HMR uses to communicate with the AP.
ESSID	Displays the current profile ESSID name.
Mode	Displays the current profile mode, either Infrastructure or Ad-Hoc.
Authentication	Displays the current profile's authentication type.
Encryption	Displays the current profile's encryption type.
Channel	Displays the current profile's channel setting.
Country	Displays the current profile's country setting.
Transmit Power	Displays the radio transmission power level.

IPv4 Status Window

The **IPv4 Status** window displays the current IP address, subnet, and other IP related information assigned to the HMR. It also allows renewing the address if the profile is using DHCP to obtain the IP information. Tap **Renew** to initiate a full DHCP discover. The **IPv4 Status** window updates automatically when the IP address changes.

To open the IPv4 Status window, tap IPv4 Status in the Wireless Status window.

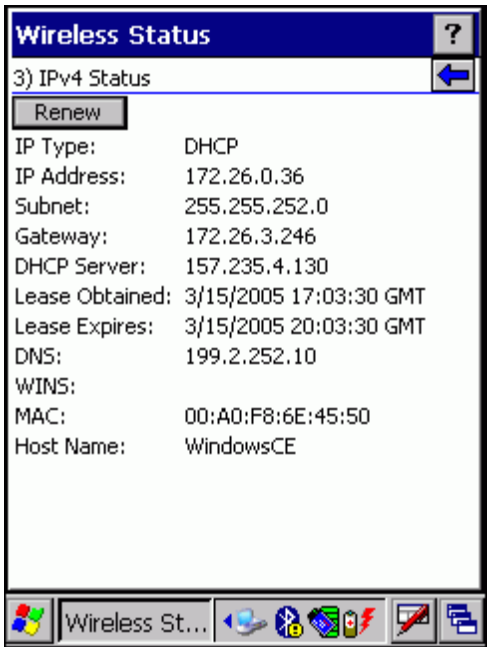


Figure 6-38 IPv4 Status Window

Table 6-22 IPv4 Status Fields

Field	Description
IP Type	Displays the IP type for the current profile: **DHCP** or **Static**. If the IP type is DHCP, leased IP address and network address data appear for the HMR. If the IP type is Static, the values displayed were input manually in the **IP Config** tab.
IP Address	Displays the HMR's IP address. The Internet is a collection of networks with users that communicate with each other. Each communication carries the address of the source and destination networks and the particular machine within the network associated with the user or host computer at each end. This address is called the IP address. Each node on the IP network must be assigned a unique IP address that is made up of a network identifier and a host identifier. The IP address as a dotted-decimal notation with the decimal value of each octet separated by a period, for example, 192.168.7.27.
Subnet	Displays the subnet address. Most TCP/IP networks use subnets to manage routed IP addresses. Dividing an organization's network into subnets allows it to connect to the Internet with a single shared network address, for example, 255.255.255.0.
Gateway	Displays the gateway address. A gateway forwards IP packets to and from a remote destination.
DHCP Server	The Domain Name System (DNS) is a distributed Internet directory service. DNS translates domain names and IP addresses, and controls Internet e-mail delivery. Most Internet services require DNS to operate properly. If DNS is not configured, Web sites cannot be located or e-mail delivery fails.
Lease Obtained	Displays the date that the IP address was obtained.
Lease Expires	Displays the date that the IP address expires and a new IP address is requested.
DNS	Displays the IP address of the DNS server.
WINS	WINS is a Microsoft Net BIOS name server. WINS eliminates the

	broadcasts needed to resolve computer names to IP addresses by providing a cache or database of translations.
MAC	An IEEE 48-bit address is assigned to the HMR at the factory to uniquely identify the adapter at the physical layer.
Host Name	Displays the name of the HMR.

Wireless Log Window

The **Wireless Log** window displays a log of recent activity, such as authentication, association, and DHCP renewal completion, in time order. Save the log to a file or clear the log (within this instance of the application only). The auto-scroll feature automatically scrolls down when new items are added to the log.

To open the **Wireless Log** window, tap **Wireless Log** in the **Wireless Status** window. The **Wireless Log** window displays.

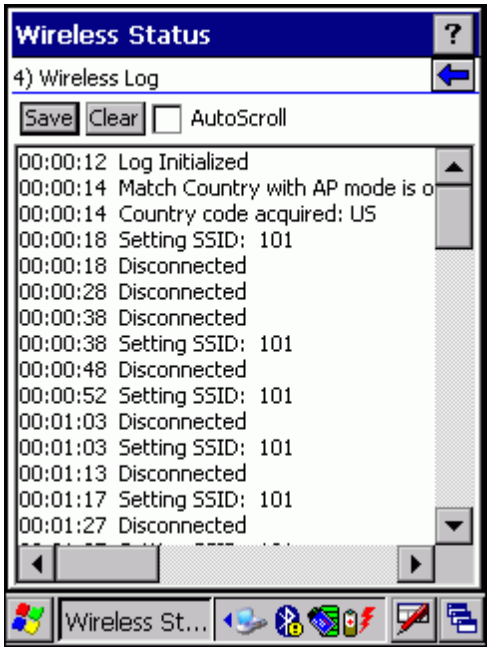


Figure 6-39 Wireless Log Window

Saving a Log

To save a Wireless Log:

1. Tap the **Save** button. The **Save As** dialog box displays.
2. Navigate to the desired folder.
3. In the **Name** filed, enter a file name and then tap **OK**. A text file is saved in the selected folder.

Clearing the Log

To clear the log, tap **Clear**.

Versions Window

The **Versions** window displays software, firmware, and hardware version numbers. This window only updates when it is displayed. There is no need to update constantly. The content of the window is determined at runtime, along with the actual hardware and software to display in the list. Executable paths of the software components on the list are

defined in registry, so that the application can retrieve version information from the executable. “File not found” appears if the executable cannot be found at the specified path.

To open the **Versions** window, tap **Versions** in the **Wireless Status** window.

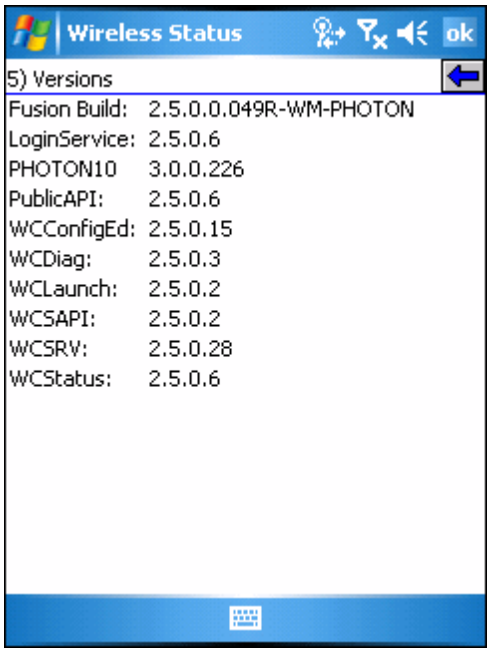


Figure 6-40 Versions Window

The window displays software version numbers for the following:

- Configuration Editor (Fusion 2.4 and lower only)
- Fusion Build
- LoginService
- PublicAPI (Fusion 2.5 and higher only)
- Photon10
- WCConfigED
- WCDiag
- WCLaunch
- WCSAPI
- WCSRV
- WCStatus

6.7 Wireless Diagnostics Application

The **Wireless Diagnostics** application window provides links to perform ICMP Ping, Trace Routing, and Known APs. To open the **Wireless Diagnostics** window, tap the **Signal Strength** icon > **Wireless Diagnostics**.

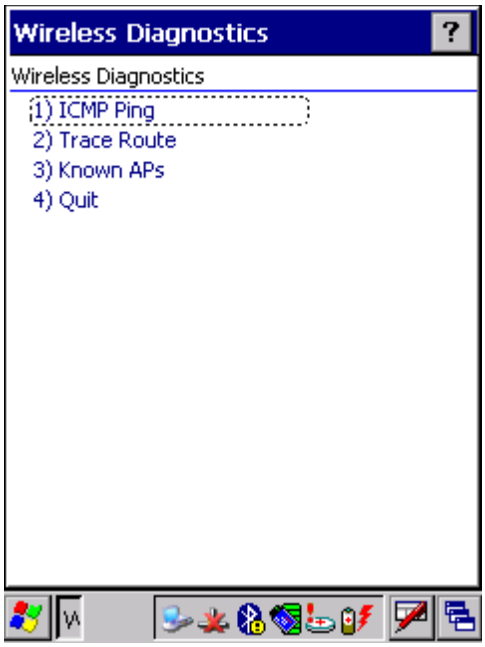


Figure 6-41 Wireless Diagnostics Window

The **Wireless Diagnostics** window contains the following options. Tap the option to display the option window.

- ICMP Ping - tests the wireless network connection.
- Trace Route - tests a connection at the network layer between the HMR and any place on the network.
- Known APs - displays the APs in range using the same ESSID as the HMR.
- Quit - Exits the **Wireless Diagnostics** window.

Option windows contain a back button  to return to the **Wireless Diagnostics** window.

ICMP Ping Window

The **ICMP Ping** window allows testing a connection at the network layer (part of the IP protocol) between the HMR and an AP. Ping tests only stop when you tap the **Stop Test** button, close the **Wireless Diagnostics** application, or if the HMR switches between infrastructure and ad-hoc modes.

To open the **ICMP Ping** window, tap **ICMP Ping** in the **Wireless Diagnostics** window.

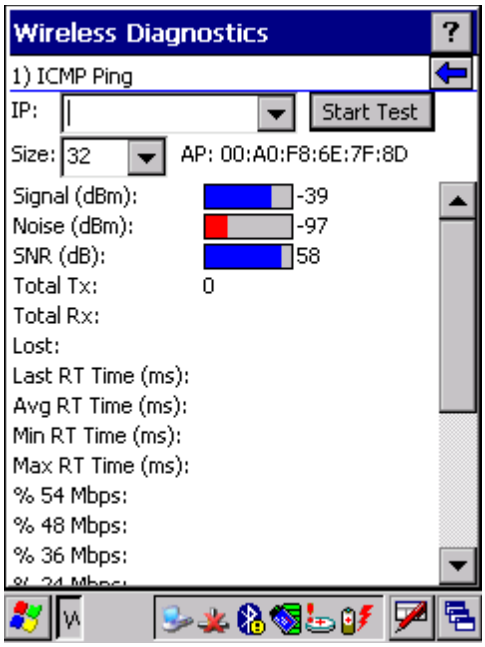


Figure 6-42 ICMP Ping Window

To perform an ICMP ping:

1. In the **IP** field, enter an IP address or select an IP address from the drop-down list.
2. From the **Size** drop-down list, select a size value.
3. Tap **Start Test**. The ICMP Ping test starts. Information of the ping test displays in the appropriate fields.

Trace Route Window

Trace Route traces a packet from a computer to a host, showing how many hops the packet requires to reach the host and how long each hop takes. The **Trace Route** utility identifies where the longest delays occur.

The **Trace Route** window allows testing a connection at the network layer (part of the IP protocol) between the HMR and any place on the network.

To open the **Trace Route** window, tap **Trace Route** in the **Wireless Diagnostics** window.

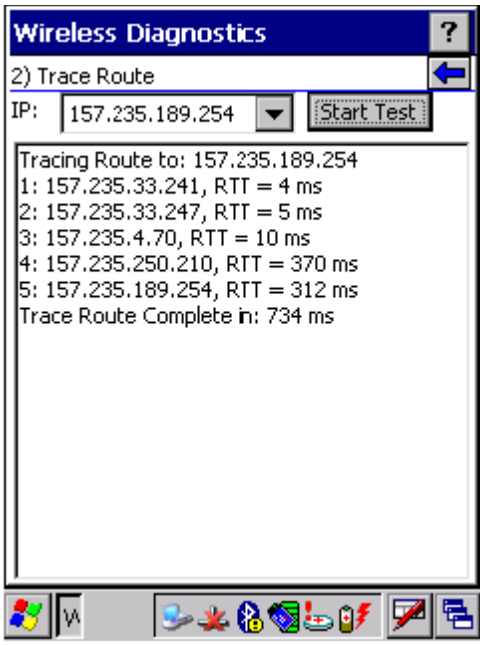


Figure 6-43 Trace Route Window

Enter an IP address or a DNS Name in the IP combo box, and tap **Start Test**. The IP combo box should match the information shown in the **ICMP Ping** window's IP combo box. When starting a test, the trace route attempts to find all routers between the HMR and the destination. The Round Trip Time (RTT) between the HMR and each router appears, along with the total test time. The total test time may be longer than all RTTs added together because it does not only include time on the network.

Known APs Window

The **Known APs** window displays the APs in range using the same ESSID as the HMR. This window is only available in **Infrastructure** mode. To open the **Known APs** window, tap **Known APs** in the **Wireless Diagnostics** window.

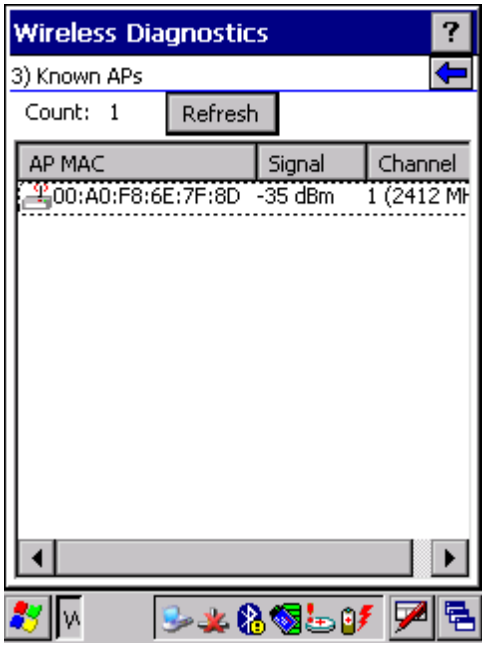


Figure 6-44 Known APs Window

Table 6-23 Current Profile Window

Icon	Description
	The AP is the associated access point, and is set to mandatory. The AP is the associated access point, but is not set to mandatory. The HMR is not associated to this AP, but the AP is set as mandatory. The HMR is not associated to this AP, and AP is not set as mandatory.

Tap and hold on an AP to display a pop-up menu with the following options: **Set Mandatory** and **Set Roaming**.

Select **Set Mandatory** to prohibit the HMR from associating with a different AP. The letter *M* displays on top of the icon. The HMR connects to the selected AP and never roams until:

1. You select **Set Roaming**
2. The HMR roams to a new profile
3. The HMR suspends
4. The HMR resets (warm or cold)

Select **Set Roaming** to allow the HMR to roam to any AP with a better signal. These settings are temporary and never saved to the registry.

Tap **Refresh** to update the list of the APs with the same ESSID. The highest signal strength value is 32.

6.8 Options

Use the wireless **Option** dialog box to select one of the following operation options from the drop-down list:

- Operating Mode Filtering
- Regulatory
- Band Selection
- System Options
- Change Password
- Export

Operating Mode Filtering

The **Operating Mode Filtering** options cause the Find WLANs application to filter the available networks found.

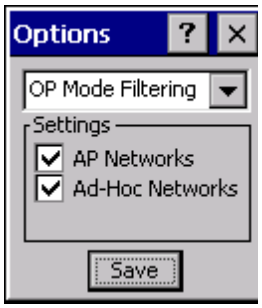


Figure 6-45 OP Mode Filtering Dialog Box

The **AP Networks** and **Ad-Hoc Networks** check boxes are selected by default.

Table 6-24 OP Mode Filtering Options

Field	Description
AP Networks	Select the **AP Networks** check box to display available AP networks and their signal strength within the **Available WLAN Networks** (see Find WLANs Application on page 103). These are the APs available to the HMR profile for association. If this option was previously disabled, refresh the **Available WLAN Networks** window to display the AP networks available to the HMR.
AD-Hoc Networks	Select the **Ad-Hoc Networks** check box to display available peer (adapter) networks and their signal strength within the **Available WLAN Networks**. These are peer networks available to the HMR profile for association. If this option was previously disabled, refresh the **Available WLAN Networks** window to display the Ad Hoc networks available to the HMR.

Tap **Save** to save the settings or tap **X** to discard any changes.

Regulatory Options

Use the **Regulatory** settings to configure the country the HMR is in. Due to regulatory requirements (within a country) a HMR is only allowed to use certain channels.

Figure 6-46 Regulatory Options Dialog Box

Table 6-25 Regulatory Options

Field	Description
Settings	Select the country from the drop-down list. To connect to a profile, the profile country must match this setting, or the AP country setting if you selected the *Enable 802.11d* check box.
Enable 802.11d	The WLAN adapter attempts to retrieve the country from APs. Profiles which use *Infrastructure* mode can only connect if the country set is the same as the AP country settings or if the profile country setting is *Allow Any Country*. All APs must be configured to transmit the country information.

Band Selection

The **Band Selection** settings identify the frequency bands to scan when finding WLANs. These values refer to the 802.11 standard networks.

Select one band for faster access when scanning for WLANs.

Figure 6-47 Band Selection Dialog Box

Table 6-26 Band Selection Options

Field	Description
2.4 GHz Band	The **Find WLANs** application list includes all networks found in the 2.4 GHz band (802.11b and 802.11g).
5 GHz Band	The **Find WLANs** application list includes all networks found in the 5 GHz band (802.11a).

Tap **Save** to save the settings or tap **X** to discard any changes.

System Options

Use **System Options** to set miscellaneous system setting.

Figure 6-48 System Options Dialog Box

Table 6-27 System Options

Field	Description
Profile Roaming	Configures the HMR to roam to the next available WLAN profile when it moves out of range of the current WLAN profile.
Enable IP Mgmt	Enables the Wireless Companion Services to handle IP address management. The Wireless Companion Service configures the IP based on what is configured in the network profile. Deselect this to manually configure the IP

	in the standard Windows IP window. Enabled by default.
Auto Time Config	Enables automatic update of the system time. Network association updates the device time based on the time set in the AP. This proprietary feature is only supported with Symbol infrastructure. Enabled by default.

Change Password

Use **Change Password** to require a password before editing a profile. This allows pre-configuring profiles and prevents users from changing the network settings. The user can use this feature to protect settings from a guest user. By default, the password is not set.

Figure 6-49 Change Password Window

To create a password for the first time, leave the **Current:** text box empty and enter the new password in the **New:** and **Confirm:** text boxes. Tap **Save**.

To change an existing password, enter the current password in the **Current:** text box and enter the new password in the **New:** and **Confirm:** text boxes. Tap **Save**.

To delete the password, enter the current password in the **Current:** text box and leave the **New:** and **Confirm:** text boxes empty. Tap **Save.**

Passwords are case sensitive and can not exceed 160 characters.

Export

Exporting options enables settings to persists after clean boot. See **Persistence** on page **139** for more information.

Use **Export** to export all profiles to a registry file, and to export the options to a registry file.

Figure 6-50 Options – Export Dialog Box

To export options:

- Tap **Export Options**. The **Save As** dialog box displays.

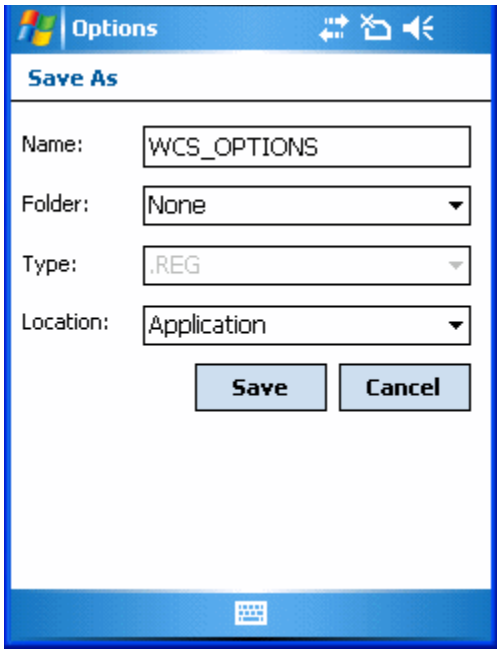


Figure 6-51 Export Options Save As Dialog Box

- Enter a filename in the **Name:** field. The default filename is WCS_OPTIONS.REG.
- Tap **Save**.

To export all profiles:

- Tap **Export All Profiles**. The **Save As** dialog box displays.

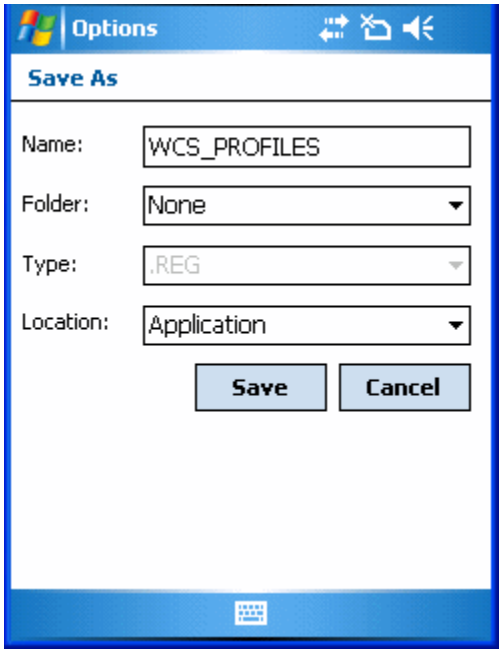


Figure 6-52 Export All Profiles Save As Dialog Box

- Enter a filename in the **Name:** field. The default filename is WCS_PROFILES.REG.
- In the **Folder:** drop-down list, select the desired folder.
- Tap **Save**.

Selecting **Export All Profiles** saves the current profile. This information is used to determine which profile to connect with after a warm boot or cold boot.

6.9 Persistence

Export options and profiles to provide clean boot persistence for Mobile 5.0 devices. Save the exported registry files in the **Application** folder to use them on a cold boot or clean boot and restore previous profile and option settings.

Currently, only server certificates can be saved for persistence. To save server certificates for persistence, save the certificate files in the folder **Application** to install the certificates automatically on a cold or clean boot.

User certificates cannot be saved for cold boot or clean boot persistence at this time.

6.10 Registry Settings

Use a registry key to modify some of the parameters. The registry path is:

HKLM\SOFTWARE\Symbol Technologies, Inc.\Configuration Editor

Table 6-28 Registry Parameter Settings

Key	Type	Default	Description
CertificateDirectory	REG_SZ	\\Applications	The default directory to find certificates.
EncryptionMask	REG_DWORD	0x0000001F	Defines the supported encryption types. This is a bitwise mask with each bit corresponding to an encryption type. 1 = Type is supported 0 = Type is not supported **Bit Number** / **Encryption Type** 0 None 1 40-Bit WEP 2 128-Bit WEP 3 TKIP 4 AES (Fusion 2.5 and higher only)

6.11 Log On/Off Application

When the user launches the **Log On/Off** application, the HMR may be in two states; the user may be logged onto the HMR by already entering credentials through the login box, or there are no user logged on. Each of these states have a separate set of use cases and a different look to the dialog box.

User Already Logged In

If already logged into the HMR, the user can launch the login dialog box for the following reasons:

- Connect to and re-enable a cancelled profile. To do this:
  - Launch the Log On/Off dialog.
  - Select the cancelled profile from the profile list.
  - Login to the profile.

Re-enable cancelled profiles using the Profile Editor Wizard and choosing to connect to the cancelled profile. Cancelled profiles are also re-enabled when a new user logs on.

1. Log off the HMR to prevent another user from accessing the current users network privileges.
2. Switch HMR users to quickly logoff the HMR and allow another user to log into the HMR.

No User Logged In

If no user is logged into the HMR, launch the login dialog box and log in to access user profiles.

The **Login** dialog box varies if it is:

1. Launched by WCS, because the service is connecting to a new profile that needs credentials.
2. Launched by WCS, because the service is trying to verify the credentials due to credential caching rules.
3. Launched by a user, when a user is logged in.
4. Launched by a user, when no user is logged in.

Table 6-29 Log On/Off Options

Field	Description
Wireless Profile Field	When launching the login application, the Wireless Profile field has available all the wireless profiles that require credentials. This includes profiles that use EAP TLS, PEAP, LEAP, and EAP-TTLS.
Profile Status Icon	The profile status icon (next to the profile name) shows one of the following states: The selected profile is cancelled. The selected profile is enabled but is not the current profile. The profile is the current profile (always the case for WCS Launched).
Network Username and Password Fields	The Network Username and Network Password fields are used as credentials for the profile selected in the Wireless Profile field. Currently these fields are limited to 159 characters.
Mask Password Checkbox	The *Mask Password* checkbox determines whether the password field is masked (i.e., displays only the '*' character) or unmasked (i.e., displays the entered text). Check the box to unmask the password. Uncheck the box to mask the password (the default).
Status Field	The status field displays status that is important to the login dialog. If the user opens the dialog and needs to prompt for credentials for a particular profile at this time, it can use the status field to let the user know that the network is held up by the password dialog being open.

Tapping **OK** sends the credentials though WCS API. If there are no credentials entered, a dialog box displays informing the user which field was not entered.

The **Log Off** button only displays when a user is already logged on. When the **Log Off** button is tapped, the user is prompted with three options: Log Off, Switch Users, and Cancel. Switching users logs off the current user and re-initialize the login dialog box to be displayed for when there is no user logged on. Logging off logs off the current user and close the login dialog box. Tapping **Cancel** closes the Log Off dialog box and the Login dialog box displays.

When the user is logged off, the HMR only roams to profiles that do not require credentials or to profiles that were created with the credentials entered into the profile.

The **Cancel** button closes the dialog without logging into the network. If the login dialog was launched by the WCS and not by the user, tapping **Cancel** first causes a message box to display a warning that the cancel disables the current profile. If the user still chooses to cancel the login at this point, the profile is cancelled.

Once a profile is cancelled, the profile is suppressed until a user actively re-enables it or a new user logs onto the HMR.

Chapter 7 ActiveSync

7.1 Introduction

To communicate with various host devices, install Microsoft ActiveSync (version 4.1 or higher) on the host computer. Use ActiveSync to synchronize information on the HMR with information on the host computer. Changes made on the HMR or host computer appear in both places after synchronization.

When a HMR with Windows Mobile 5.0 is connected to a host computer and an ActiveSync connection is made, the WLAN radio is disabled. This is a Microsoft security feature to prevent connection to two networks at the same time.

ActiveSync software:

1. Allows working with HMR-compatible host applications on the host computer. ActiveSync replicates data from the HMR so the host computer can view, enter, and modify data on the HMR.
2. Synchronizes files between the HMR and the host computer, converting the files to the correct format.
3. Backs up the data stored on the HMR. Synchronization is a one-step procedure that ensures the data is always safe and up-to-date.
4. Copies (rather than synchronizes) files between the HMR and host computer.
5. Controls when synchronization occurs by selecting a synchronization mode, e.g., set to synchronize continually while the HMR is connected to the host computer, or set to synchronize on command.
6. Selects the type of information to synchronize and control how much data is synchronized.

7.2 Installing ActiveSync

To install ActiveSync on the host computer, download version 4.1 or higher from the Microsoft web site at http://www.microsoft.com. Refer to the installation included with the ActiveSync software.

7.3 HMR Setup

Microsoft recommends installing ActiveSync on the host computer before connecting the HMR.

The HMR can be set up to communicate either with a serial connection or a USB connection. Chapter 3, Accessories provides the accessory setup and cable connection information for use with the HMR. The HMR communication settings must be set to match the communication settings used with ActiveSync.

- On the HMR tap **Start** > **Programs** > **ActiveSync** icon. The **ActiveSync** window appears.

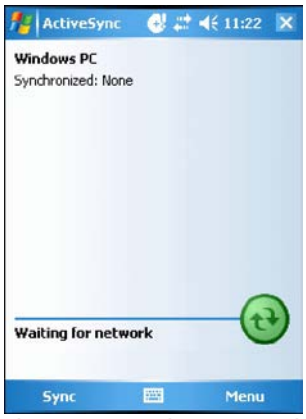


Figure 7-1 ActiveSync Window

- Tap Menu > Connections.
- Select the connection type from the drop-down list.
- Tap OK to exit the Connections window and tap OK to exit the ActiveSync window.
- Proceed with installing ActiveSync on the host computer and setting up a partnership.

7.4 Setting Up an ActiveSync Connection on the Host Computer

To start Active Sync:

- Select **Start** > **Programs** > **Microsoft ActiveSync** on the host computer. The **ActiveSync** Window displays.

Figure 7-2 ActiveSync Window

Assign each HMR a unique device name. Do not try to synchronize more than one HMR to the same name.

- In the **ActiveSync** window, select **File** > **Connection Settings**. The **Connection Settings** window appears.

Figure 7-3 Connection Settings Window

- Select the appropriate check box for the type of connection used.
- Select the **Show status icon in Taskbar** check box.
- Select **OK** to save any changes made.

7.5 Synchronization with a Windows Mobile 5.0 Device

When a HMR with Windows Mobile 5.0 is connected to a host computer and an ActiveSync connection is made, the WLAN radio is disabled. This is a Microsoft security feature to prevent connection to two networks at the same time.

To synchronize with a Windows Mobile 5.0 device:

- If the **Get Connected** window does not appear on the host computer, select **Select** > **All Programs** > **Microsoft ActiveSync**.

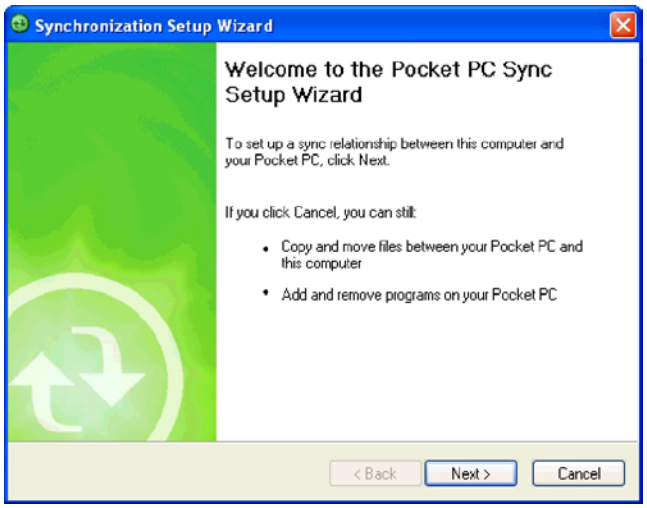


Figure 7-4 Synchronization Setup Wizard Window

- Click **Next**.

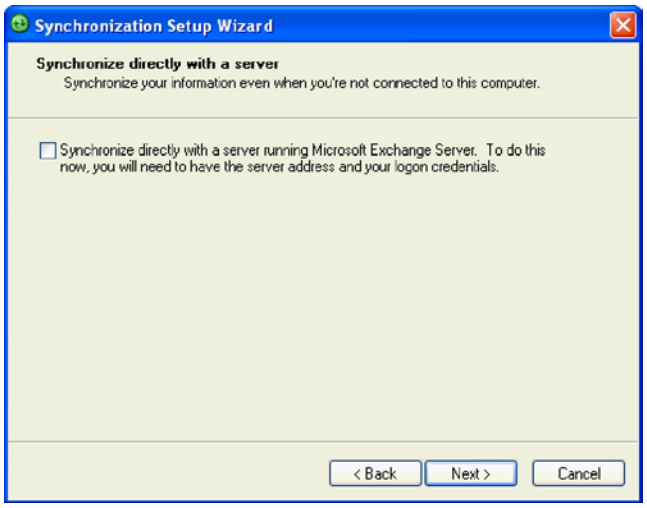


Figure 7-5 Synchronization Directly With a Server Window

- Select the check box to synchronize with a server running Microsoft Exchange.
- Click **Next**.

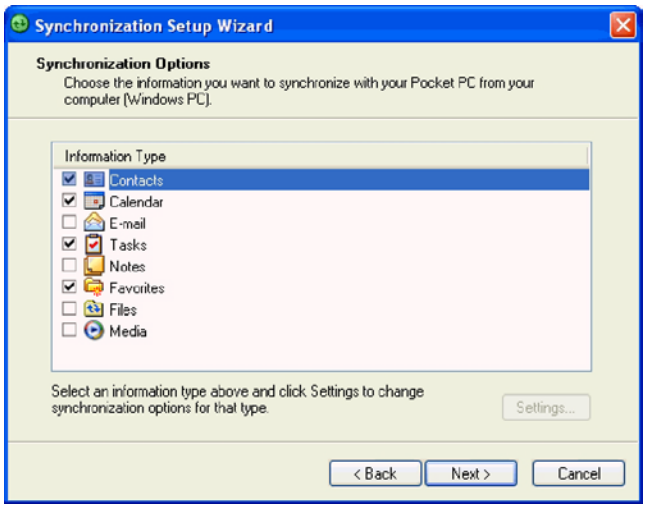


Figure 7-6 Synchronization Option Window

- Select the appropriate settings and click **Next**.

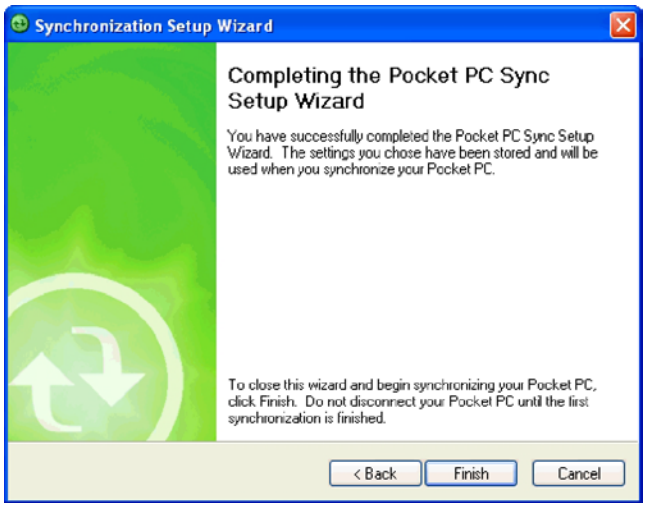


Figure 7-7 Wizard Complete Window

- Click **Finish**.

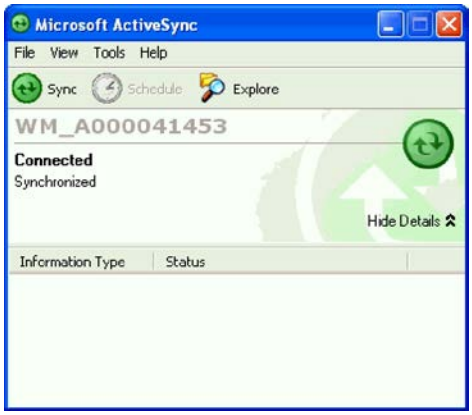


Figure 7-8 ActiveSync Connected Window

During the first synchronization, information stored on the HMR is copied to the host computer. When the copy is complete and all data is synchronized, the HMR can be disconnected from the host computer.

The first ActiveSync operation must be performed with a local, direct connection. Windows Mobile retains partnerships information after a cold boot.

For more information about using ActiveSync, starts ActiveSync on the host computer, then see ActiveSync Help.

Chapter 8 Application Deployment

8.1 Introduction

This chapter describes features available in Windows Mobile 5.0 including new security features, how to package applications, and procedures for deploying applications onto the HMR.

8.2 Security

The HMRs implement a set of security policies that determine whether an application is allowed to run and, if allowed, with what level of trust. To develop an application, you must know the security configuration of the device, and how to sign an application with the appropriate certificate to allow the application to run (and to run with the needed level of trust).

Application Security

Application security controls the applications that can run on the HMR.

1. Trusted- All applications must be digitally signed by a certificate on the HMR.
2. Prompted - User is prompted to allow unsigned applications to run.
3. Open - All applications run.

Developers can include their own certificates and provision the device to “trusted”.

Digital Signatures

Digital signatures provide a way to authenticate the author of EXEs, DLLs, and packages. Digitally signed applications give users confidence that an application comes from where they think it comes from. For example, if an end-user downloads an update package from the internet that is digitally signed with Symbol's software certificate, they are assured that the package is authentic and that it was created by Symbol. By enforcing the use of digital signatures, users can also prevent malicious applications from executing on the HMR. For example, users can provision the HMR to only execute “trusted” applications (digitally signed).

Symbol ships all Windows Mobile 5.0 based products in an “open” state, which means all signed and unsigned applications should work. However, customers can still reconfigure their HMRs to operate in the “trusted” mode. This means that only applications signed with a certificate from the Privileged Execution Trust Certificate Store can run.

To support the broadest number of deployments, third-party software developers should perform the following when releasing software for Windows Mobile 5.0 devices:

- Sign all their EXEs & DLLs with their private key.
- Provide the corresponding public certificate to end-users so that it can be installed into Privileged Execution Trust Certificate Store.

If the software is installed via a .CAB file, developer should also:

- Sign the .CAB file with their private key.
- Provide the corresponding public certificate to end-users so that it can be installed into SPC Certificate Store.

Locking Down a HMR

Like most configuration options in Windows Mobile 5.0, security settings are set via XML provisioning. For example, to enforce the “trusted” model and only allow applications signed with a privileged certificate to run, use the following provisioning document:

```
<wap-provisioningdoc>
  <characteristic type="SecurityPolicy">
    <!-- Disallow unsigned apps -->
    <parm name="4102" value="0"/>
    <!-- No Prompt -->
    <parm name="4122" value="1"/>
  </characteristic>
</wap-provisioningdoc>
```

For more information on various security options, refer to the Security Policy Settings topic in the latest Windows Mobile documentation.

Installing Certificates

Use XML provisioning to query and delete certificates from certificate stores. To add a new certificate the Privileged Execution Trust Certificate Store, use the following sample provisioning document:

```
<wap-provisioningdoc>
  <characteristic type="CertificateStore">
    <characteristic type="Privileged Execution Trust Authorities">
      <characteristic type="657141E12FA45786F6A57CA6464032D4B3A55475">
        <parm name="EncodedCertificate" value="This is sample text."/>
      </characteristic>
    </characteristic>
  </characteristic>
</wap-provisioningdoc>
```

To create your own provisioning document with real certificate information:

- Obtain a certificate from a security provider such as VeriSign.
- Double-click on the certificate file (.CER) to open it.
- Click on the *Details* tab and locate the *Thumbprint* field.
- Copy the contents of the *Thumbprint* field and replace the value in the XML example above.
- Click the **Copy to File…** button.
- Click **Next** to start the Certificate Export Wizard.
- Select *Base-64 encoded X.509 (.CER)* and then click **Next**.
- Set the File Name to CertOutput.xml and click **Next**.
- Click **Finish** to export the certificate.
- Open the exported file, CertOutput.xml, in a text editor (i.e., NotePad).
- Copy the contents of the file (excluding the first line, last line, and CR/LF) and replace the value of the *"EncodedCertificate"* parameter in the xml example above.

Device Management Security

You can control access to certain device settings and security levels, such as installing applications and changing security settings. Refer to the *Windows Mobile Version 5.0 Help* file for information on device management security.

Remote API Security

The Remote API (RAPI) enables applications that run on a desktop to perform actions on a remote device. RAPI provides the ability to manipulate the file system on the remote device, including the creation and deletion of files and directories. By default, Symbol ships with RAPI in the restricted mode. Certain tools, such as RAPIConfig, may not work properly. Refer to the Windows Mobile Version 5.0 Help file for finding information on Remote API security policies.

8.3 Packaging

Applications compiled for Windows Mobile 5.0 are not backward-compatible with previous versions.

Packaging combines an application's executable files into a single file, called a package. This makes it easier to deploy and install an application to the HMR. Package new applications and updates, such as new DLL files, as CAB files, then deploy them to Windows Mobile 5.0 devices. Refer to the Microsoft Windows Mobile 5.0 Help file for information on CAB files.

8.4 Deployment

To install applications onto the HMR, developers package the application and all required files into a CAB file, and then load the file onto the HMR using one of the following options:

- Microsoft ActiveSync 4.1 or greater
- Storage Card
- AirBEAM
- Image Update (for updating the operating system)

Refer to the *Microsoft Windows Mobile 5.0 Help* file for information on CAB files.

Installation Using ActiveSync

To install an application package:

1. Connect the HMR to a host computer using ActiveSync. See Chapter 7, ActiveSync for more information.
2. Locate the package file on the host computer.
3. In ActiveSync on the host computer, open *Explorer* for the HMR.
4. Copy the CAB file from the host computer to the \temp directory on the HMR.
5. On the HMR, navigate to the \temp directory.
6. Tap on the application CAB file. The application installs on the HMR.

Installation Using Storage Card

To install an application package:

1. Copy the package CAB file to a storage card using an appropriate storage card reader.
2. Install the storage card into the HMR. See Multi Media Card (MMC) / Secure Device (SD) Card on page 26 for more information.
3. On the HMR, open **File Explorer**.
4. Open the **Storage Card** directory.
5. Tap the package CAB file. The application installs on the HMR.

Installation Using AirBEAM

See Chapter 9, Staging and Provisioning for information on AirBEAM.

Image Update

Windows Mobile 5.0 contains an Image Update feature that updates all operating system components. All updates are distributed as update packages. Update packages can contain either partial or complete updates for the operating system. Symbol distributes the update packages on the Support Central web site, http://support.symbol.com.

To update an operating system component, copy the update package to the HMR using one of a variety of transports, including ActiveSync, an SD memory card, or Symbol AirBEAM. Then, initiate the update using one of the following methods:

- Double-tap the package file in **File Explorer** (similar to extracting a CAB file).
- Perform a special boot sequence that initiates the update.
- Use AirBEAM.

The HMR must have at least 5 MB of free space to perform an OS update.

To initiate an update:

1. Go to the Support Central web site, http://support.symbol.com.
2. Download the appropriate update package.
3. Copy the update package to either the \temp directory on the HMR, or to a storage card.
4. Connect the HMR to AC power. See Chapter 3, Accessories.
5. Press the primary battery release on the HMR to partially eject the battery from the HMR.
6. While the battery is partially released, simultaneously press and release the trigger and the Power button.

After you insert the battery you have 2 seconds to press the trigger or left scan button.

7. Push the battery to fully re-insert it in the HMR. One audible click can be heard as the battery is fully inserted.
8. Press and hold the trigger.
9. Connect the HMR to AC power using the CAM or insert the HMR into a powered cradle.
10. The Update Loader application first looks for a file on a storage card. If it does not find it, it looks in the \temp directory.

    When it finds the appropriate file, it loads the package onto the HMR. A progress bar displays until the update completes.
11. The HMR re-boots.
12. The calibration screen appears.

When initiating an update via a boot sequence, the update loader looks for updates first on the root of an installed SD card and then in the \temp folder on the HMR's persistent storage volume. A response file, pkgs.lst, indicates which files to update. In most cases, Symbol provides this pkgs.lst file with the update and you should only modify it when updating a splash screen partition. See Creating a Splash Screen for more information.

Creating a Splash Screen

Use a bitmap file to create a customized splash screens for the HMR. Use Image Update with a bitmap file, rather than a package file, to update the splash screen.

To create a custom splash screen:

1. Create a .bmp file using a graphic program with the following specifications:
   - Size: 240 x 296
   - Colors: 8 bits per pixel (256 colors) for color displays

2. Modify the bitmap file and save.

To load the splash screen on the HMR:

- Create a text file named pkgs.lst which contains the name of the bmp file. For example, *mysplash.bmp*.
- Copy the bmp file and the pkgs.lst file to one of the following:
  - SD card root directory
  - HMR's \temp directory
  - HMR's \Windows directory
- If using an SD card, insert the SD card into the HMR.
- Perform a cold boot.
- Press the trigger or side scan button for 5 seconds while booting to invoke the Update Loader and install the splash screen.

8.5 XML Provisioning

To configure the settings on a HMR, XML provisioning should be used. To install an XML provisioning file on the HMR, create a Cabinet Provisioning File (CPF) file. A CPF file is similar to a CAB file and contains just one file: _setup.xml. Like a CAB file, the CPF extension is associated with WCELoad.EXE. Opening a CPF extracts the XML code and uses it to provision and configure the HMR. The user receives an e-mail notification indicating success or failure.

XML Provisioning provides the ability to configure various features of the HMR (i.e., registry and file system). However, some settings require security privileges. To change registry settings via a CPF file, certain privileges (roles) are required. Some registry keys require only an *Authenticated User*, while other registry keys require a *Manager*. Refer to the Windows Mobile 5.0 Help file, *Metabase Settings for Registry Configuration Service Provider* section, for the default role settings in Windows Mobile 5.0.

For those registry settings that require the *Manager* role, the CPF file must be signed with a privileged certificate installed on the device. Refer to the *Microsoft Windows Mobile 5.0 Help* file and the *Windows Mobile 5.0 SDK* for instructions and sample test certificates.

Creating an XML Provisioning File

To create a .cpf file:

1. Create a valid provisioning XML file named _setup.xml using an XML editor or the tools supplied with Visual Studio 2005. (For example, use the SampleReg.xml sample created in the RegMerge section below and rename it _setup.xml.) Ensure the file contains the required parameters for the operation. Refer to the *Microsoft Windows Mobile 5.0 Help* file for information.
2. In the Windows Mobile 5.0 tools directory on the desktop computer (typically \Program Files\Windows CE Tools\wce500\Windows Mobile 5.0 Pocket PC SDK\Tools), run the Makecab.exe utility, using the following syntax to create a .cpf file from the _setup.xml file:

   MakeCab.exe /D COMPRESS=OFF _setup.xml myOutCpf

   COMPRESS=OFF is required for backward compatibility with Pocket PC.

3. Optionally, use the Authenticode tools to sign the .cpf file.
4. Tap the filename to install.
5. Certain applications and settings require a cold boot to take affect. In these cases, cold boot the HMR. Refer to the *Windows Mobile Version 5.0 Help* file for more information.

XML Provisioning vs. RegMerge and CopyFiles

Prior to Windows Mobile 5.0, Symbol used two drivers (RegMerge and CopyFiles) to update the registry and to copy files during a cold boot. With Windows Mobile 5.0, Symbol recommends using XML provisioning instead. RegMerge and CopyFiles are supported for backward compatibility but Symbol may eliminate support in the future. The following sections provide examples of how RegMerge and CopyFiles were used, and how to perform the same function using XML provisioning.

RegMerge

RegMerge.dll is a built-in driver that allows updating the registry during a clean boot. RegMerge runs very early in the boot process and looks for registry files (.reg files) in certain Flash File System folders (i.e., \Application) during a clean boot. It then merges the registry changes into the system registry located in RAM.

The following example uses RegMerge to set a registry key:

SampleReg.reg

```
[HKEY_LOCAL_MACHINE\Hardware\DeviceMap\Backlight]
"BacklightIntensity"=dword:00000036
```

The following example uses XML provisioning to perform the same task:

SampleReg.xml

```
<wap-provisioningdoc>
  <characteristic type="Registry">
    <characteristic type="HKLM\Hardware\DeviceMap\Backlight">
      <parm name="BacklightIntensity" value="54" datatype="integer" />
    </characteristic>
  </characteristic>
</wap-provisioningdoc>
```

CopyFiles

CopyFiles copies files from one folder to another on a clean boot. During a clean boot CopyFiles looks for files with a .CPY extension in the root of the Application FFS partition. These files are text files containing the source and destination for the desired files to copy, separated by ">".

The following example uses CopyFiles to copy a file from the \Application folder to the \Windows folder:

SampleCpy.cpy

```
\Application\example.txt > \Windows\example.txt
```

The following example uses XML provisioning to perform the same task:

SampleCpy.xml

```
<wap-provisioningdoc>
  <characteristic type="FileOperation">
    <characteristic type="\Windows" translation="filesystem">
      <characteristic type="MakeDir"/>
        <characteristic type="example.txt" translation="filesystem">
```

```
        <characteristic type="Copy">
          <parm name="Source" value="\Application\example.txt" translation="filesystem"/>
        </characteristic>
      </characteristic>
    </characteristic>
  </characteristic>
</wap-provisioningdoc>
```

8.6 Storage

Windows Mobile 5.0 contains three types of file storage:

- Random Access Memory (RAM)
- Persistent Storage
- Application folder

Random Access Memory

Executing programs use RAM to store data. Data stored in RAM is lost upon a warm boot. RAM also included a volatile file storage area called *Cache Disk*.

Volatile File Storage (Cache Disk)

Windows Mobile 5.0 memory architecture uses persistent storage for all files, registry settings, and database objects to ensure data is retained even after a power failure. Persistent storage is implemented using Flash memory technology which is generally slower than volatile RAM memory. In certain situations the speed of the operation is more important than the integrity of the data. For these situations, the HMR includes a small volatile File Storage volume, accessed as the *Cache Disk* folder. Disk operations to the *Cache Disk* folder are much faster than to any of the persistent storage volumes, but data is lost across warm boots and power interruptions. Note that a backup battery powers RAM memory, including the *Cache Disk*, when you remove the main battery for a short period of time.

The HMR uses the *Cache Disk* for temporary data that can be restored from other sources, for example, for temporarily "caching" HTML web pages by a browser or generating formatted files to send to a printer. Both situations benefit from the increased speed of the cache disk, but you can restore the data if needed.

DO NOT use the *Cache Disk* as a method to improve application performance. Analyze applications that perform slower in persistent storage to optimize disk access. Common areas for optimization include minimizing the number of reads and writes to a file, removing unneeded debug logging, and minimizing file flushing or closing files.

Persistent Storage

Windows Mobile 5.0 protects all data and applications from power-related loss. Because Windows Mobile 5.0 mounts the entire file system and registry in persistent storage (rather than using RAM), HMR devices provide a reliable storage platform even in the absence of battery power.

Persistent storage provides application developers with a reliable storage system available through the standard file system and registry APIs. Persistent storage is optimized for large reads and writes; therefore, applications reading and writing data in

large chunks tend to outperform those applications reading and writing small blocks of data. Data in persistent storage is lost upon a clean boot.

Persistent storage contains all the directories under the root directory except for Application, Cache Disk, and Storage Card (if a storage card is installed). Persistent storage is approximately 60 MB (formatted).

Application Folder

The Application folder is a super-persistent storage that is persistent even after a clean boot. Accessing data in the Application folder is slower than accessing persistent storage. The Application folder is used for deployment and device-unique data. For example, network profiles can be stored in the Application folder so that connection to the network is available after a cold boot. The Application folder is approximately 20 MB (formatted).

8.7 System Configuration Manager

The System Configuration Manager (SCM) is a utility that runs on the development computer and is used to create configuration files. These files, when deployed to an HMR, set configuration parameters for that device.

The configurable options for a HMR are defined in an XML file that is available on the Symbol OSS for the HMR. SCM is also available on Symbol OSS.

SCM eliminates the potential user errors that occur when manually editing registry settings.

File Types

SCM uses three types of files:

- Symbol Configuration Template (.SCT) files are XML files that define the configurable parameters for a device.
- Registry Configuration Service Provider XML files for device provisioning.
- CAB Provisioning Format (.CPF) file which is a .CAB archive that contains the provisioning XML. This file is downloaded to the HMR and merged upon a cold boot.

User Interface

SCM's user interface consists of a tree control on the left side of the window which displays all the configuration categories, and a data grid table on the right which displays all the configurable controls for the selected category. Figure 8-1 on page 155 shows the main window for a device's .sct file.

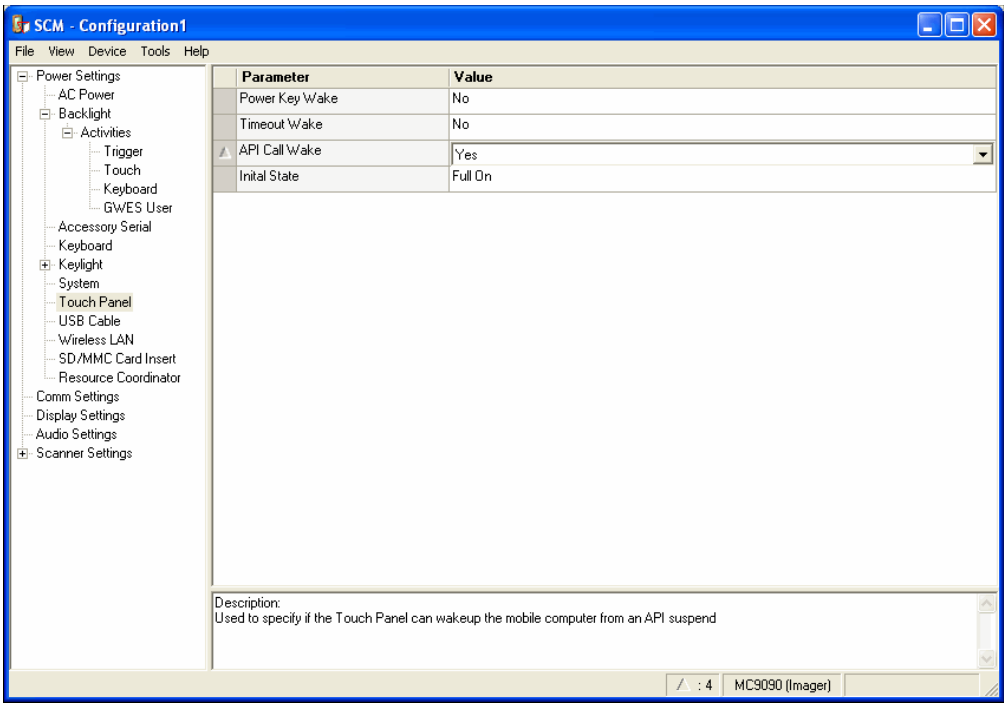


Figure 8-1 Main SCM Window

Menu Functions

Use the main menu to access the program functionality described in Table 8-1.

Table 8-1 SCM Menu Functions

Menu Item	Description
File Menu	
Open Config File	Open a saved configuration file (.SCD).
Save Config Changes	Save changes to the currently loaded configuration file.
Restore All Defaults	Restore all parameter values to the default state. The default values are stored in a Symbol Configuration template file (i.e., MC9090.sct).
Get Defaults from Device	Load all parameter values from the current device.
Export Changes to .reg	Export the changed parameter values to an reg file.
Export Changes to .xml	Export the changed parameter values to an XML file.
Export Changes to .cpf	Export the changed parameter values to an CPF file.
Export all to .reg	Export all the parameter values to an reg file.
Export all to .xml	Export all the parameter values to an XML file.
Export all to .cpf	Export all the parameter values to an CPF file.
Exit	Exit SCM.
Device Menu	
Device Type	Change the current device type template. Each template (available from the Support Central) must reside in the SCM directory.
Tools Menu	
Signing Wizard	Adds a digital signature to a file.
Reg File Conversion Wizard	Converts a .reg file into a cpl or cab file.
Help Menu	
About	Display the *About* dialog which shows the application

version.

Parameter State Indicators

The first column of the data table displays parameter state indicators. The state indicators display one of the states in Table 8-2 for a particular parameter:

Table 8-2 Parameter Status Indicators

Icon	Indicator	Description
	Modified	This parameter was changed from its initial factory setting.
	Invalid	This parameter is not valid for the selected device type. This can occur when a configuration file for one type of device is loaded and the device type is changed using the **Device** menu. Values marked “invalid” are not included in an exported.

Window Status Bar

The SCM status bar found on the bottom right corner of the window contains the items in Table 8-3 from left to right:

Table 8-3 Window Status Bar Items

Status Bar Item	Description
Invalid Count	Number of parameters not valid for the selected device.
Modified Count	Number of parameters modified from the factory defaults.
Device Type	Device type – version.

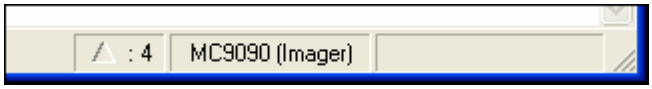


Figure 8-2 Sample Status Bar

The sample status bar in Figure 8-2 shows that the current configuration file contains 4 modified parameters.

File Deployment

The .reg file created by the SCM export function must be deployed to the HMR.

- Select **File** > **Export changes to .reg** to create a .reg file for only the changes made or select **File** > **Export all to .reg** to create a .reg file for all settings.
- Copy the .reg file to the HMR.
- Tap the filename to install.
- Certain applications and settings require a cold boot to take affect. In these cases, cold boot the HMR. Refer to the *Windows Mobile Version 5.0 Help* file for more information.

8.8 Rapid Deployment Client

The Rapid Deployment (RD) Client facilitates software downloads to a HMR from a Mobility Services Platform (MSP) Console FTP server. The MSP Console is a web-based interface to the wireless infrastructure monitoring and management tools provided by the MSP Lite or MSP Enterprise server.

When software packages are transferred to the FTP server, the HMR on the wireless network can download them. The location of software packages are encoded in RD bar codes. When the HMR scans a bar code(s), the software package(s) is downloaded from the FTP server to the HMR. Multiple HMRs can scan a single RD bar code. The Staging

section of Chapter 9 provides the RD support information applicable to the HMR. Information on the following topics is provided:

1. Rapid Deployment Window
2. Scanning RD Bar Codes

8.9 AirBEAM Smart

The AirBEAM Smart product allows specially designed software packages to be transferred between a host server and Symbol wireless handheld devices. Before transfer, AirBEAM Smart checks and compares package versions, so that only updated packages are loaded.

AirBEAM Smart resides on radio-equipped client devices and allows them to request, download, and install software, as well as to upload files and status data. A single communications session performs both file download and upload. The ability to transfer software over a radio network can greatly reduce the logistical efforts of client software management. The AirBEAM Smart Client section of Chapter 9 provides the AirBEAM Smart support information applicable to the HMR. Information on the following topics is provided:

1. AirBEAM Package Builder
2. AirBEAM Smart Client
3. Synchronizing with the Server
4. AirBEAM Staging

8.10 Symbol Mobility Developer Kits

The Symbol Mobility Developer Kit (SMDK) family of products supports developing applications that take advantage of the capture, move and manage capabilities of the HMRs. Go to the Symbol Support Central to download the appropriate developer kit.

Chapter 9 Staging and Provisioning

9.1 Introduction

This chapter describes how to stage devices using Rapid Deployment and provisioning using MSP Agent or AirBEAM Smart.

9.2 Staging

Staging is the process of setting up the HMR to download packages for provisioning. The HMR uses the Rapid Deployment (RD) Client for staging.

- Windows Mobile OEM version 01.35.0002 and lower use MSP 2.X RD Client version 1.9.0.
- Windows Mobile OEM version 02.39.0001 and higher use MSP 3.X RD Client version 3.28.

RD Client Version 1.9.0

The Rapid Deployment (RD) Client version 1.9.0 facilitates software downloads to a HMR from a Mobility Services Platform (MSP) Console's FTP server. The MSP Console is a web-based interface to the wireless infrastructure monitoring and management tools provided by the MSP Lite or MSP Enterprise server.

When software packages are transferred to the FTP server, the HMR on the wireless network can download them to the HMR. The location of software packages are encoded in RD bar codes. When the HMR scans a bar code(s), the software package(s) is downloaded from the FTP server to the HMR. A single RD bar code can be scanned by multiple HMRs.

- For detailed information about the MSP Console, MSP Lite/MSP Enterprise servers and creating RD bar codes, refer to the MSP Users Guide, p/n 72E-91844-xx.

The **Rapid Deployment** window displays bar code scan status and provides features for resetting and exiting the application.

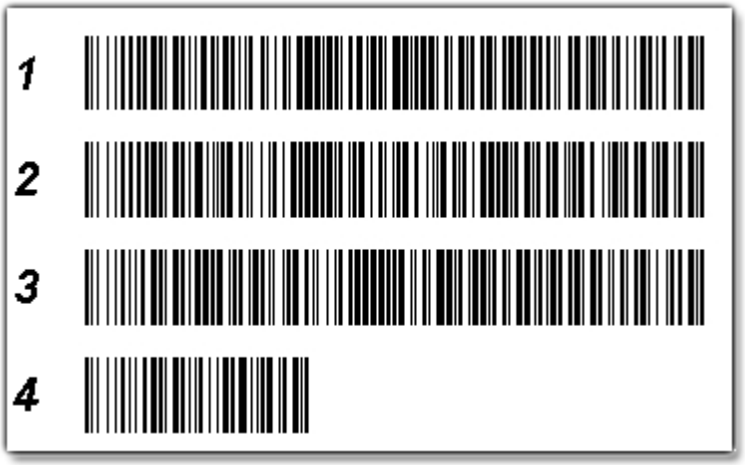


Figure 9-1 RD Bar Code Printout Sample

To access the Rapid Deployment window tap > Programs > Rapid Deployment Client.

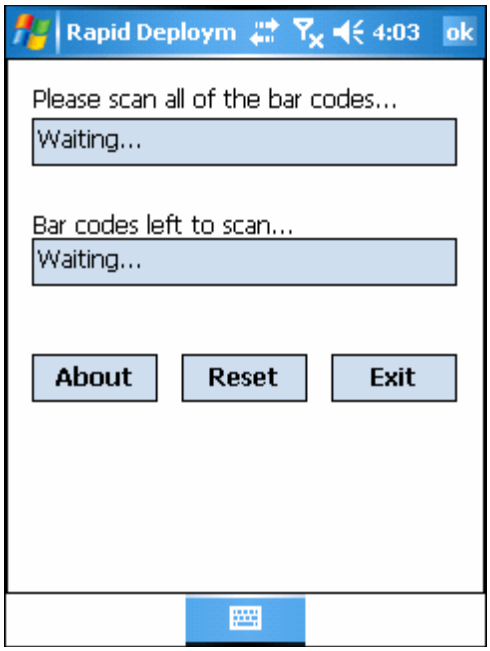


Figure 9-2 Rapid Deployment Window (Version 1.9.0)

Table 9-1 Rapid Deployment Application Descriptions

Text Box/Button	Description
Please scan all of the bar codes…	Displays the status of a scanned bar code. Waiting – indicates the HMR is ready to scan a bar code. OK – indicates the HMR successfully scanned a bar code. (The indicator LED bar on the HMR turns green and a beep sounds). If there are no bar codes left to scan, the **Rapid Deployment Configuring** window displays.
Bar codes left to scan…	Displays a list of any remaining bar codes to scan (1-D bar codes only). When all required bar codes are scanned successfully, the **Rapid Deployment Configuring** window displays.
About	Displays the **Rapid Deployment Client Info** window.
Reset	Removes any previously scanned data.
Exit	Closes the application. A confirmation window displays. Tap **Yes** to exit or **No** to return to the **Rapid Deployment** window. Note: If the application is exited prior to scanning all required bar codes, any scanned data collected up to that point is lost.

Scanning RD Bar Codes

Use only a scanner connected to the serial port when scanning bar codes using the RD Client.

When the HMR scans and successfully decodes a single or multiple RD bar codes, the data encoded in the bar code can:

1. Reset the HMR's connection profile. A connection profile is a set of Wireless Application parameters that the HMR uses to access the wireless network.
2. Initiate downloads of one or more software packages from an FTP server to the HMR.

RD Client version 1.9.0 only recognizes AirBEAM software packages. See **AirBEAM Smart Client** on page **176** for more information.

To scan an RD bar code:

- Obtain the appropriate RD bar code(s) from the MSP Administrator.
- Launch the RD application on the HMR. The **Rapid Deployment** window displays.

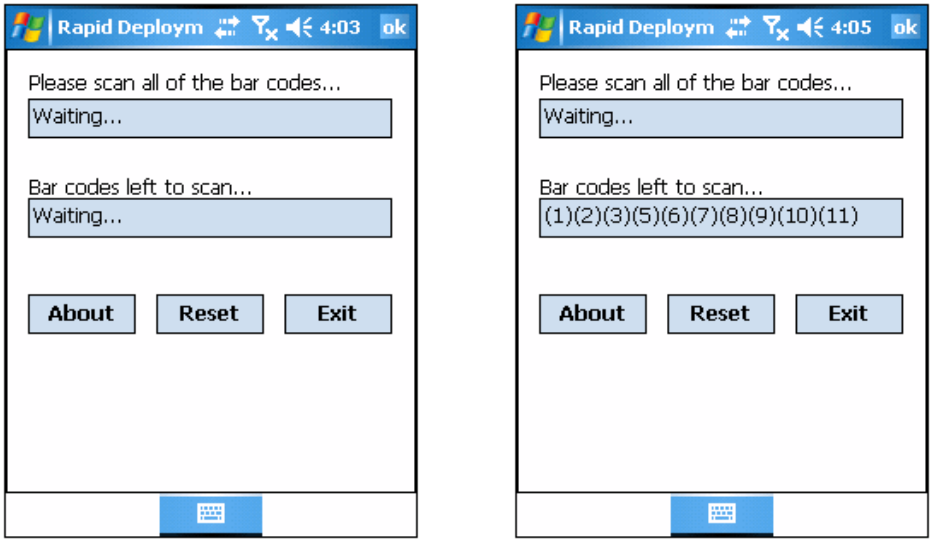


Figure 9-3 Rapid Deployment Window

- Scan the appropriate bar code(s) to complete the configuration and/or download.
  - A PDF417 bar code (2-D bar code) can contain all download data in a single bar code. In this case, only one bar code may be required to scan.
  - Multi-part linear bar codes (1-D bar codes) can require scanning several bar codes. Bar codes can be scanned in any order. The text box under **Bar codes left to scan...** shows the remaining bar codes to scan (see Figure 9-7).
- After all appropriate bar codes are scanned successfully, the HMR connects to the server and the **Rapid Deployment Configuring** window displays while network settings are configured.

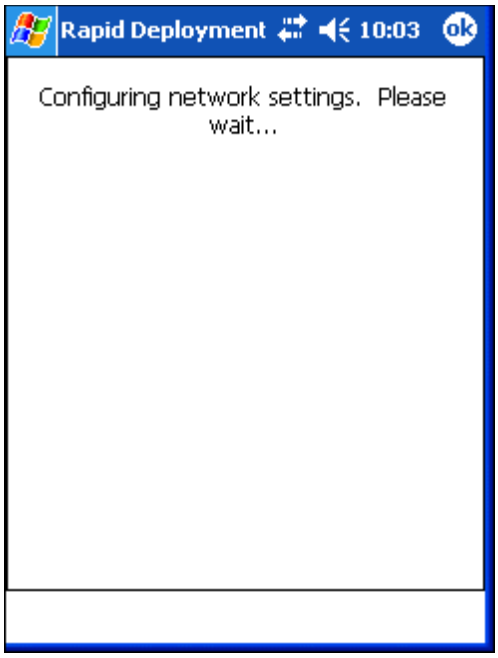


Figure 9-4 Rapid Deployment Window – Configuring

If the HMR cannot connect to the server, it continues to retry until the user cancels (exits) the application. If failure to connect to the server persists, see the MSP Administrator.

- When configuration is complete:
  - A new Wireless profile is created on the HMR from the data encoded in the bar code(s) scanned. See Chapter 6, Wireless Applications for more information about wireless profiles.
  - The designated package(s) are downloaded from the FTP server.

RD Client Version 3.28

The RD Client version 3.28 enables simple and rapid provisioning of new (out of the box) HMRs and simplifies the out-of-box provisioning by scanning bar codes or connecting to a profile server. The RD Client acts as a frontend for wireless radio configuration, automating the manual configurations that would normally be required to use these tools.

The MSP 3.X Rapid Deployment Client enables staging by scanning staging profiles encoded into staging bar code sheets. It also enables staging to be performed without scanning bar codes through the use of On-Demand Staging. When using On-Demand Staging, the RD Client pulls staging profiles directly from an On-Demand Profile Server over some form of pre-configured or automatically-configured IP connection. For detailed information about the MSP 3.X, refer to the Mobility Services Platform 3.X User's Guide.

An MSP Administrator uses the MSP Console for the creation of an RD profile that contains all the wireless network and security information (for example, ESSID, WEP Keys, etc.) required to get a HMR onto the wireless network. The profile also contains FTP server access information needed to connect to the provisioning MSP and the list of software packages to be provisioned to the HMR from the provisioning MSP. The RD profile can then be encoded into an RD bar code sheet and printed from the MSP Console or loaded onto a profile server.

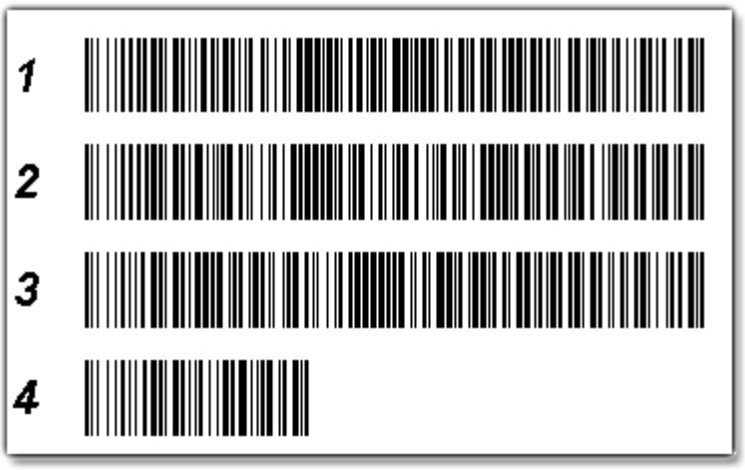


Figure 9-5 RD Bar Code Printout Sample

Bar Code Scanning

The **Rapid Deployment** window displays bar code scan status and provides features for resetting and exiting the application.

To access the Rapid Deployment window tap > Programs > Rapid Deployment Client.

The **Rapid Deployment** window displays bar code scan status and provides features for resetting and exiting the application.

Use only a scanner connected to the serial port when scanning bar codes using the RD Client.

To access the **Rapid Deployment** window:

- Obtain the appropriate RD bar code sheet from the MSP Administrator.
- Tap > **Programs** > **Rapid Deployment Client**. The **Scan Barcodes To Deploy** window displays.

  The RD Client waits for the first bar code scan.

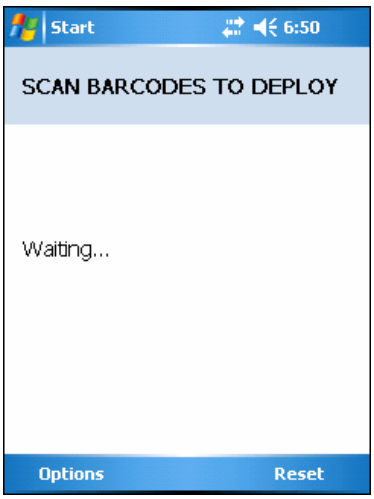


Figure 9-6 Waiting for Bar Codes

- Scan the first bar code. The window indicates which bar code to scan next.

Multi-part linear bar codes (1-D bar codes) can require scanning several bar codes. Bar codes can be scanned in any order. The display indicate the bar code to scan.

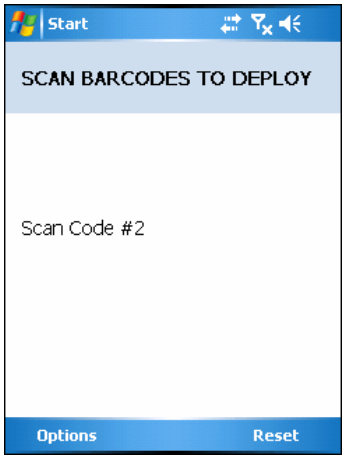


Figure 9-7 Rapid Deployment Window

- After all the bar codes are scanned successfully, the HMR connects to the server and the **PROCESSING PROFILE** window displays while network settings are configured.

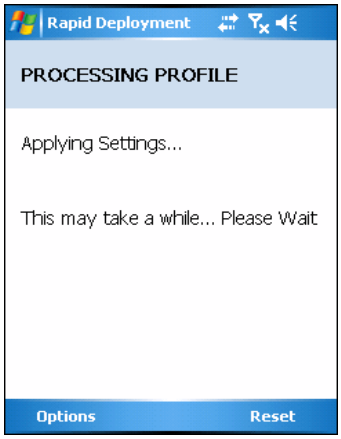


Figure 9-8 Rapid Deployment Window – Processing Profile

- When staging is complete the **STAGING COMPLETE** window displays.

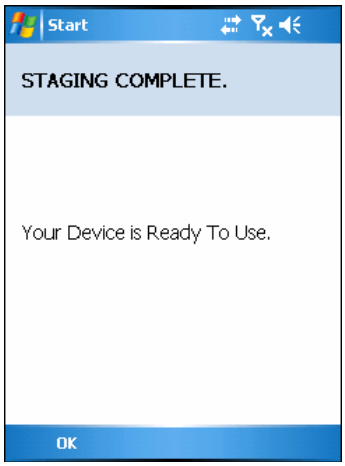


Figure 9-9 Staging Complete Window

- Press the left function key to exit the **RD Client**.

On-Demand Staging

The MSP 3.X **RD Client** also enables staging without having to scan bar codes through the use of On-Demand Staging (Electronic Staging).

When using On-Demand Staging, the RD Client pulls staging profiles directly from an On-Demand Profile Server over some form of pre-configured or automatically-configured IP connection. The following types of IP connection modes are currently supported for Electronic Staging:

ActiveSync Connection Mode

This mode uses the IP connection that is established when the HMR is directly connected (via a USB cable, serial cable or cradle) to a host computer running ActiveSync. The most common scenario would be where the On-Demand Profile Server is running on the host computer to which the HMR is connected via ActiveSync. It would, however, also work with the On-Demand Profile Server running on any other host computer that is on the same subnet as the host computer to which the HMR is connected via ActiveSync.

Ethernet Connection Mode

This mode uses the IP connection that is established when a HMR is inserted into an Ethernet cradle that is plugged into the Ethernet LAN. Some HMRs come ready to use with Ethernet cradles while others require software to be installed and configured before an Ethernet cradle connection can be established. The RD Client does not do anything to install Ethernet cradle software or configure or establish an Ethernet cradle connection, but does use one if it exists. The On-Demand Profile Server must be running on a host computer that is on the same subnet to which the Ethernet cradle is connected.

Already existing IP Connection Mode

This mode uses any IP connection that is already active on the HMR. This could be a direct Ethernet port (if available), or a WLAN connection that was configured and established before the **RD Client** was launched. It could also be any other form of IP connection that might be available on the HMR. The **RD Client** does not do anything to configure or establish such connections, but uses them if they exist. The On-Demand Profile Server must be running on a host computer that is on the same subnet that is accessible from the connection.

Well-known WLAN Connection Mode

This mode works only on supported Motorola WLAN adapters. The **RD Client** attempts to configure and establish WLAN IP connections using pre-defined Motorola WLAN settings. If the **RD Client** is able to successfully configure and establish such a connection, and if an On-Demand Profile Server is running on a host computer that is on the same subnet that is accessible from the connection, then Electronic Staging proceeds using that connection.

To perform On-Demand Staging:

- In the **App Launcher** menu, press the center function key to launch the **RD Client**. The **Scan Barcodes To Deploy** window displays.

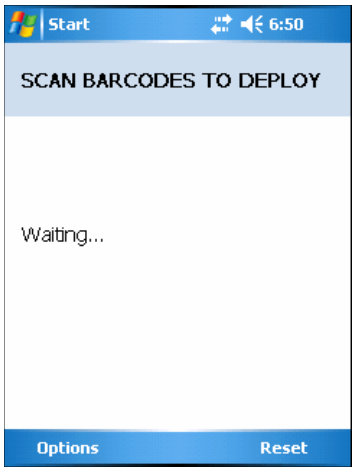


Figure 9-10 Waiting for Bar Codes

- Press the left function key to select **Options**. The **Main Menu** window appears.

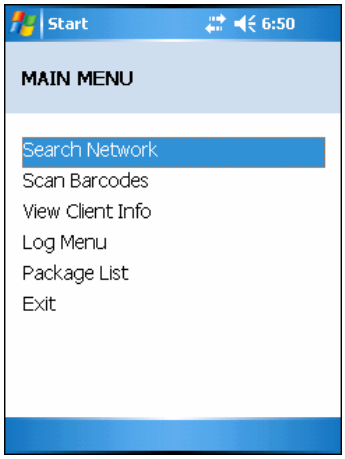


Figure 9-11 RD Client Main Menu

- Use the up/down arrow keys to select **Search Network** and then press the center function key. The **SEARCHING NETWORKS** window appears.

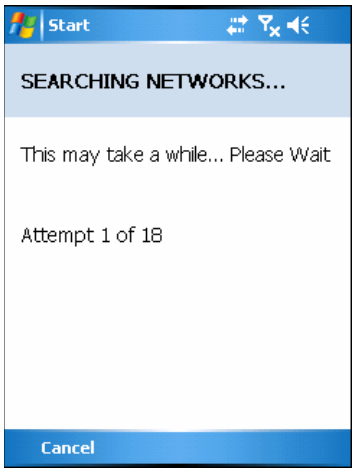


Figure 9-12 RD Client Searching for On-Demand Profile Server

- When complete, the **STAGING COMPLETE** window displays.

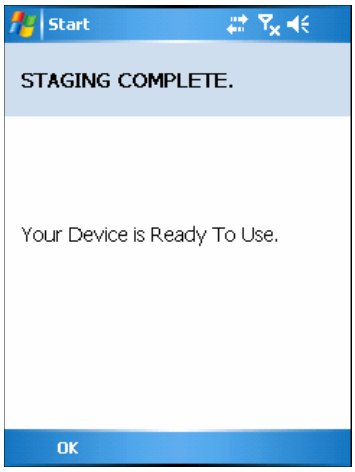


Figure 9-13 Staging Complete Window

- Press the left function key to exit.

RD Client Main Menu

The RD Client **Main Menu** contains the following options:

- Search Network. See On-Demand Staging on page 164 for detailed information.
- Scan Barcodes. See Bar Code Scanning on page 162 for detailed information.
- View Client Info.
- Log Menu.
- Package List.
- Exit – Closes the RD Client application.

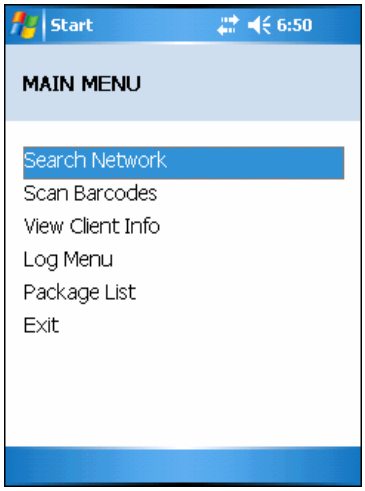


Figure 9-14 RD Client Main Menu

Client Info

Use the **Client Info** window to view the following information:

- RD Client version.
- Product name.
- Operating system type.
- Plug-in type.

Tap **View Client Info** option.

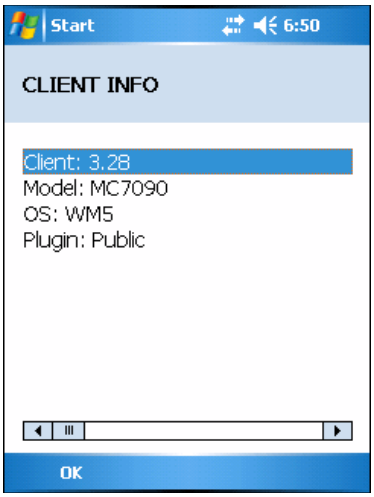


Figure 9-15 Client Info Window

Tap **OK** to return to the **Main Menu**.

Log Menu

The **Log Menu** contains the following options:

- View Log.
- View Job Log.
- Set Log Level.
- Set Job Log Level.

Select **Log Menu** option.

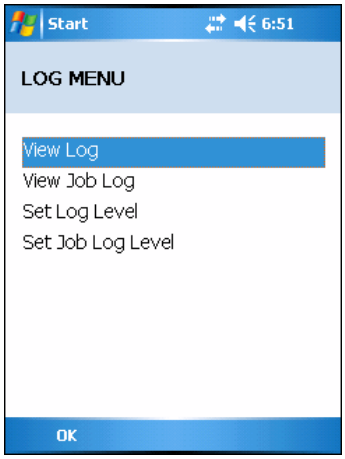


Figure 9-16 Log Menu Window

Tap **OK** to return to the **Main Menu**.

View Log

Use the **View Log** option to display a list of events that have occurred.

Select **View Log** option.

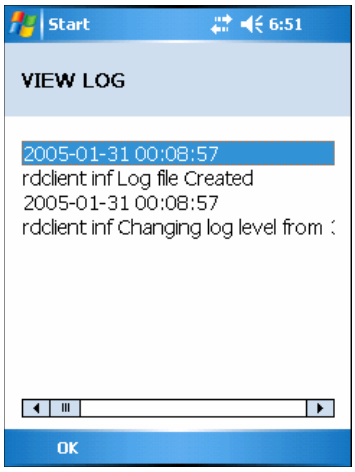


Figure 9-17 View Log Window

Tap **OK** to return to the **Log Menu**.

View Job Log

Use the **View Job Log** option to display a list of jobs that have be processed.

Select **View Job Log** option.

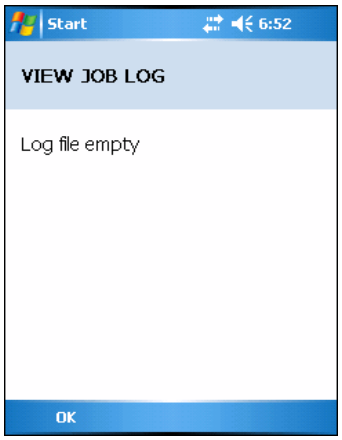


Figure 9-18 View Job Log Window

Tap **OK** to return to the **Log Menu**.

Set Log Level

Use the **Set Log Level** option to set the level of the information that appears in the log.

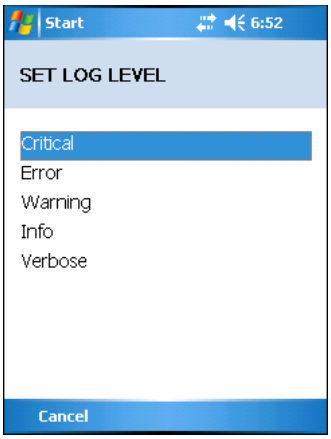


Figure 9-19 Set Log Level Window

Select a level option.

Set Job Log Level

Use the **Set Job Log Level** option to set the level of the information that appears in the Job log.

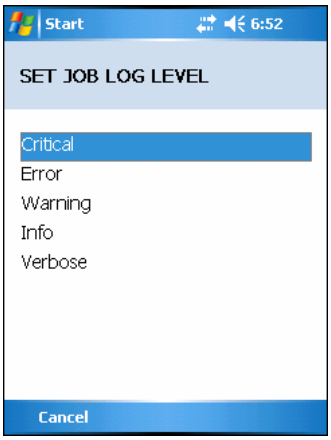


Figure 9-20 Set Job Log Level Window

Select a level option.

Package List

Use the **Package List** option to display the packages that have been installed on the HMR.

Select the **Package List** option.

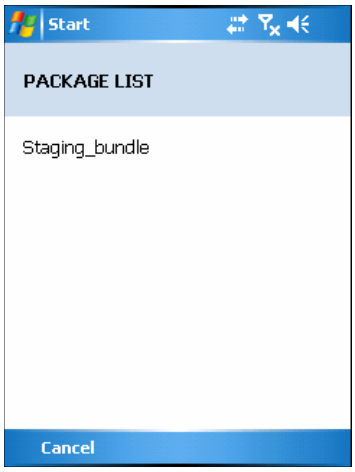


Figure 9-21 Package List Window

Tap **OK** to return to the **Main Menu**.

9.3 Provisioning

The MC90X supports two types of provisioning:

- MSP Agent.
- AirBEAM Smart Client.

MSP Agent

MSP Agent is also known as MSP 3.X Provisioning Client.

The Provisioning Client replaces AirBEAM Client and is responsible for implementing device-side provisioning activities as defined by a policy. A policy is evaluated on the MSP 3.X system and delivered to devices as job documents via relay servers.

The MSP 3.X Provisioning Client is 100% backward compatible to prior versions of the AirBEAM Client. Existing AirBEAM Smart users can use the MSP 3.X Provisioning Client as a 100% backward compatible replacement for prior versions of AirBEAM client, when used in Classic AirBEAM mode with existing FTP servers.

Existing MSP 2.X users can use the new Provisioning Client as a 100% backward compatible replacement for previous versions of AirBEAM Client, when used in Level 2 Agent and Level 3 Agent modes with existing MSP 2.X Appliances.

For more detailed information on MSP Agent (Provisioning Client), refer to the *MSP 3.X User's Guide* (p/n 72E-100158-xx).

MSP Agent Main Menu

The MSP Agent **Main Menu** contains the following options:

- Monitoring Processing.
- Force Check-In.
- Package List.
- View Client Info.
- Log Menu.
- Hide UI.
- Exit – exits the MSP Agent application.

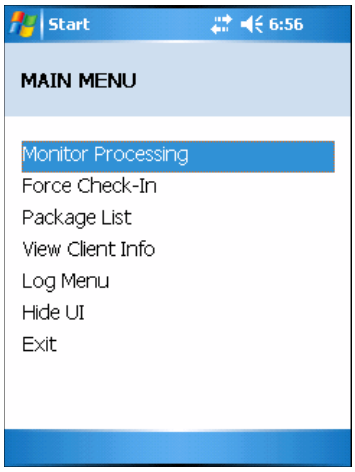


Figure 9-22 MSP Agent Main Menu

Monitor Processing

Use the **Monitor Processing** option to view the status of packages being processed.

Select the **Monitor Processing** option.

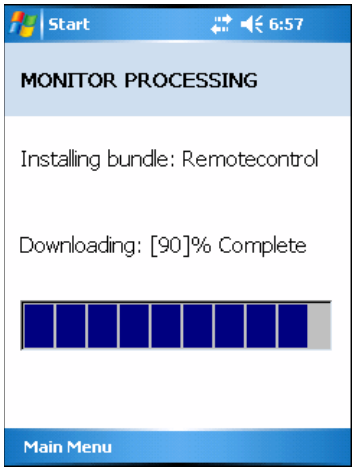


Figure 9-23 Monitor Processing Window

Tap **OK** to return to the **Main Menu**.

Force Check-In

Use the **Force Check-In** option to check instantly for pending package downloads instead of waiting for the next automatic check that the client performs.

Select the **Force Check-In** option.

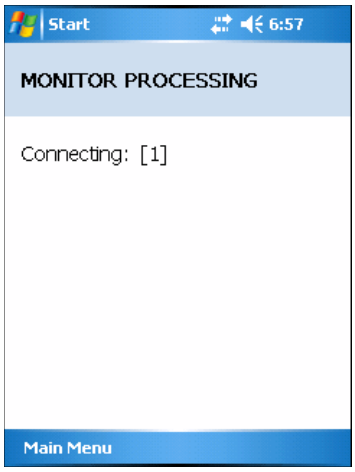


Figure 9-24 Force Check-in Window

Tap **OK** to return to the **Main Menu**.

Package List

Use the **Package List** option to display the packages that have been installed on the HMR.

Select the **Package List** option.

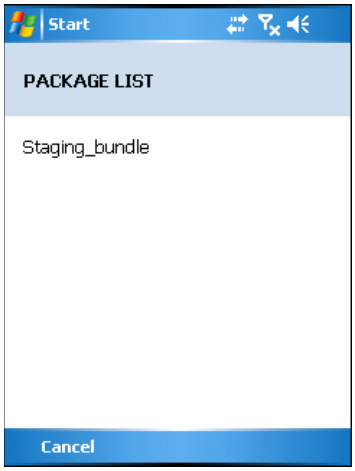


Figure 9-25 Package List Window

Tap **OK** to return to the **Main Menu**.

Client Info

Use the **Client Info** window to view the following information:

- RD Client version.
- Product name.
- Operating system type.
- Plug-in type.

Select **View Client Info** option.

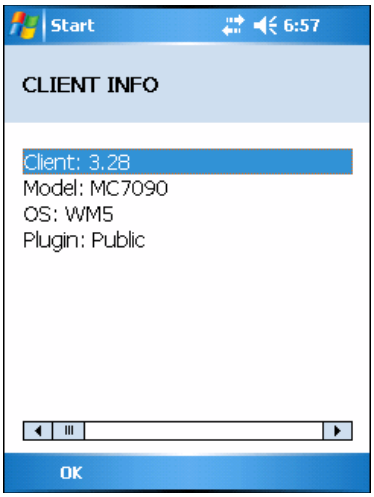


Figure 9-26 Client Info Window

Tap **OK** to return to the **Main Menu**.

Log Menu

The **Log Menu** contains the following options:

- View Log.
- View Job Log.
- Set Log Level.
- Set Job Log Level.

Select **Log Menu** option.

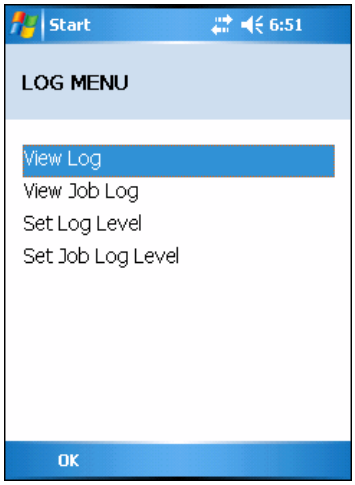


Figure 9-27 Log Menu Window

Tap **OK** to return to the **Main Menu**.

View Log

Use the **View Log** option to display a list of events that have occurred.

Select **View Log** option.

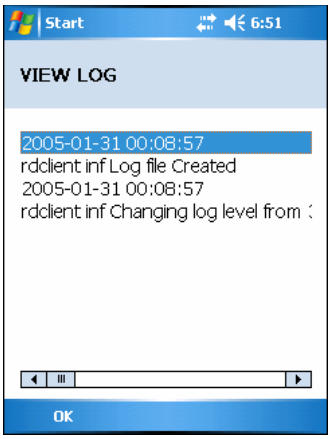


Figure 9-28 View Log Window

Tap **OK** to return to the **Log Menu**.

View Job Log

Use the **View Job Log** option to display a list of jobs that have be processed.

Select **View Job Log** option.

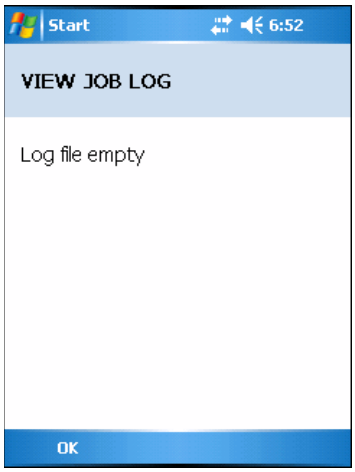


Figure 9-29 View Job Log Window

Press the left function key to return to the **Log Menu**.

Set Log Level

Use the **Set Log Level** option to set the level of the information that appears in the log.

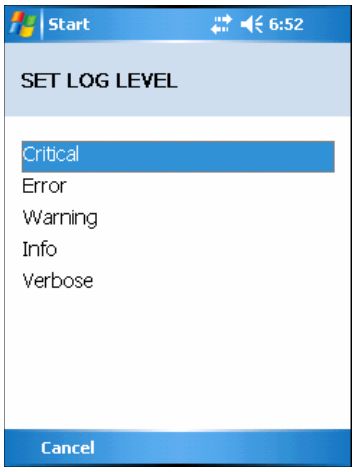


Figure 9-30 Set Log Level Window

Select a level option.

Set Job Log Level

Use the **Set Job Log Level** option to set the level of the information that appears in the Job log.

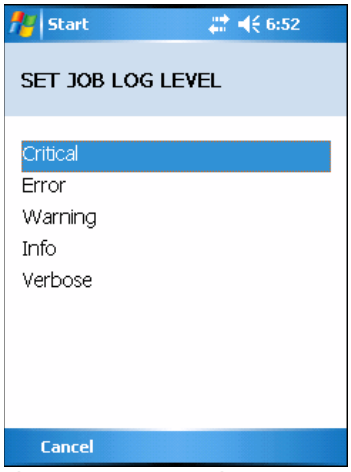


Figure 9-31 Set Job Log Level Window

Select a level option.

Hide UI

Use the **Hide UI** option to minimize the MSP Agent application. The MSP Agent application runs in the background while minimized.

To un-hide the application, select the **MSP Agent** icon in the task tray and select the **UnHide UI** menu item.

Figure 9-32 UnHide UI Selection

AirBEAM Smart Client

The AirBEAM Smart product allows specially designed software packages to be transferred between a host server and a HMR. Before transfer, AirBEAM Smart checks and compares package version, so that only updated packages are loaded.

AirBEAM Smart resides on the HMR and allows it to request, download and install software, as well as to upload files and status data. Both download and upload of files can be accomplished in a single communications session. The ability to transfer software over a wireless network can greatly reduce the logistical efforts of client software management.

In an AirBEAM Smart system, a network-accessible host server acts as the storage point for the software transfer. The AirBEAM Smart Client uses the industry standard FTP or TFTP file transfer protocols to check the host system for updates and, if necessary, to transfer updated software.

For more detailed information about AirBEAM Smart, refer to the AirBEAM® Smart Windows® CE Client Product Reference Guide (p/n 72-63060-01).

AirBEAM Package Builder

In a typical distributed AirBEAM system, software to be transferred is organized into packages. In general, an AirBEAM package is simply a set of files that are assigned attributes both as an entire package and as individual component files. The package is assigned a version number and the transfer occurs when an updated version is available.

An AirBEAM package can optionally contain developer-specified logic to be used to install the package. Installation logic is typically used to update client device flash images or radio firmware. Examples of common AirBEAM packages would include packages for custom client application software, radio firmware and AirBEAM Smart Client software.

Once these packages are built, they are installed on the host server for retrieval by the HMR. The AirBEAM Package Builder is a utility used to define, generate and install AirBEAM packages to a server. The packages are then loaded from the server onto a client device equipped with an AirBEAM Smart Client executable. For detailed instructions on how to define, generate and install AirBEAM packages to the server, refer to the *AirBEAM Package Builder Product Reference Guide*, p/n 72-55769-01.

AirBEAM Smart Client

The AirBEAM Smart Client is installed on the HMR. It is configured with the server access information, the names of the packages to be downloaded and other controlling parameters. When the AirBEAM Smart Client is launched, the device connects to the

specified FTP server and checks the packages it is configured to look for. If the package version was updated, the client requests the transfer.

AirBEAM License

The AirBEAM Smart Client is a licensed software product. The AirBEAM Smart Client's version synchronization functionality is enabled through a license key file that is stored on the HMR. The license key file can be built into AirBEAM Smart Client's image, or downloaded in a special AirBEAM package.

The AirBEAM license key file contains a unique key and a customer specific banner that is displayed when the AirBEAM Smart Client version synchronization logic is invoked.

Configuring the AirBEAM Smart Client

- Connect the HMR to a host computer using the Development Cable.
- Connect the HMR using Remote Desktop.
- Select **Start** > **Programs** > **AirBEAM Smart Client**. The **AirBEAM Smart CE** window appears.
- Select **File** > **Configure**. The **AirBEAM** configuration window appears.

Figure 9-33 AirBEAM Configuration Window

The configuration window is used to view and edit AirBEAM Smart Client configurations. This dialog box has seven tabs that you can modify - Packages(1), Packages(2), Server, Misc(1), Misc(2), Misc(3) and Misc(4).

Packages(1) Tab

Use this tab to specify the package name of the first four of eight packages that are to be loaded during the AirBEAM synchronization process. The specified package name must correspond to a package that is available on the specified package server.

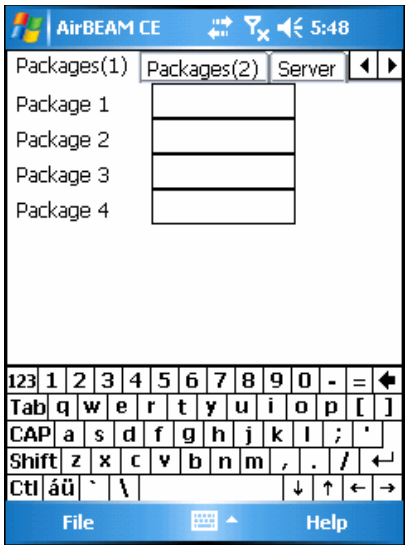


Figure 9-34 Package (1) Tab

Table 9-2 Package (1) Tab Descriptiob

Field	Description
Package 1	Package name of the first of eight packages. This is an optional field.
Package 2	Package name of the second of eight packages. This is an optional field.
Package 3	Package name of the third of eight packages. This is an optional field.
Package 4	Package name of the fourth of eight packages. This is an optional field.

No inadvertent trailing spaces should be entered on the Packages(1) tab. Information entered in these fields are case and space sensitive.

Packages(2) Tab

Use this tab to specify the package name of the last four of eight packages that are to be loaded during the AirBEAM synchronization process. The specified package name must correspond to a package that is available on the specified package server.

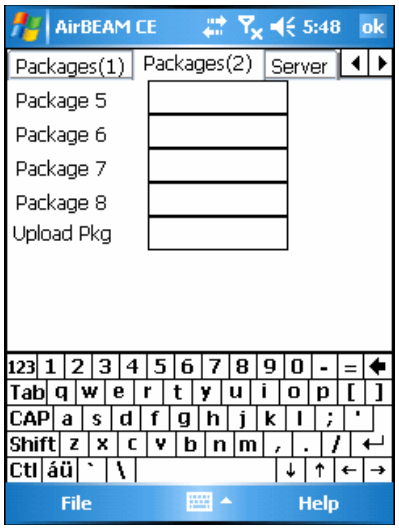


Figure 9-35 Package (2) Tab

Table 9-3 Package (2) Tab Description

Field	Description
Package 5	Package name of the fifth of eight packages. This is an optional field.
Package 6	Package name of the sixth of eight packages. This is an optional field.
Package 7	Package name of the seventh of eight packages. This is an optional field.
Package 8	Package name of the eighth of eight packages. This is an optional field.
Upload Pkg	Package name of a package that is to be processed for “upload files” during the AirBEAM synchronization process. The specified package name must correspond to a package that is available on the specified package server. This is an optional field.

No inadvertent trailing spaces should be entered on the Packages(2) tab. Information entered in these fields are case and space sensitive.

Server Tab

Use this tab to specify the configurations of the server to which the client connects during the package synchronization process.

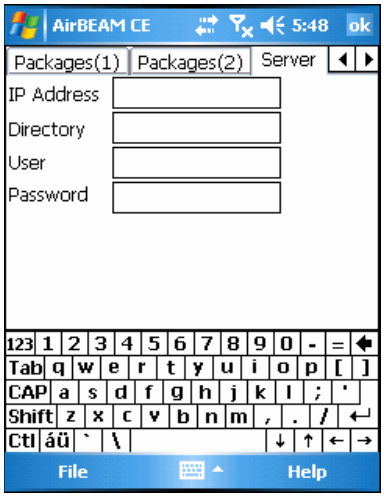


Figure 9-36 Server Tab

Table 9-4 Server Tab Descriptions

Field	Description
IP Address	The IP Address of the server. It may be a host name or a dot notation format.
Directory	The directory on the server that contains the AirBEAM package definition files. All AirBEAM package definition files are retrieved from this directory during the package synchronization process.
User	The FTP user name that is used during the login phase of the package synchronization process.
Password	The FTP password that corresponds to the FTP user specified in the **User** field. The specified password is used during the login phase of the package synchronization process.

No inadvertent trailing spaces should be entered on the Server tab. Information entered in these fields are case and space sensitive.

Misc(1) Tab

Use this tab to configure various miscellaneous features.

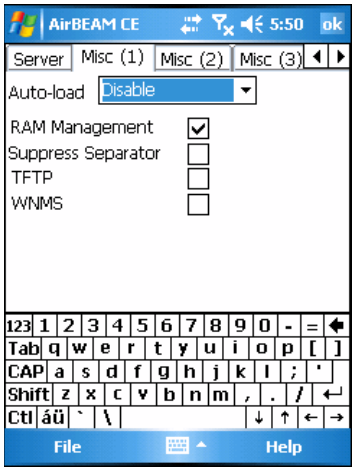


Figure 9-37 Misc (1) Tab

Table 9-5 Misc (1) Tab Descriptions

Field	Description
Auto-load	This drop-down list is used to specify how the AirBEAM Smart Client is to be invoked automatically when the client device is rebooted. The selections are: **Disable**: the AirBEAM Smart Client is not invoked automatically during the boot sequence. **Interactive**: the AirBEAM Smart Client is invoked automatically during the boot sequence. The package synchronization process is started automatically. The *Synchronization Dialog* box appears and the user is required to press the **OK** button when the process is complete. **Non-interactive**: the AirBEAM Smart Client is invoked automatically during the boot sequence. The package synchronization process is started automatically. The *Synchronization Dialog* box is displayed, but the user is not required to select **OK** when the process is complete. The *Synchronization Dialog* box terminates automatically. **Background**: the AirBEAM Smart Client is invoked automatically during the boot sequence. The package synchronization process is started automatically. Nothing is displayed while the synchronization process is occurring.
RAM Management	This check box specifies whether the automatic RAM management is enabled during the package synchronization process. If enabled, RAM management logic is invoked when there is not enough free disk space to download a package. The RAM management logic attempts to remove any discardable AirBEAM packages resident on the client.
Suppress Separator	This check box specifies whether the automatic insertion of a file path separator character should be suppressed when the client generated server package definition file names. When enabled, the parameter also disables the appending of .apd to the package. This feature is useful for AS/400 systems, in which the file path separator character is a period. When this feature is enabled, the server directory (Directory) and package name (Package 1, Package 2, Package 3 and Package 4) are appended “as is” when building the name for the server package definition file.

Field	Description
	When this feature is disabled, a standard file path separator is used to separate the server directory (Directory) and package name (Package 1, Package 2, Package 3 and Package 4) when building the name for the server package definition file. In addition, an .apd extension is appended automatically.
TFTP	This check box specifies whether the TFTP protocol is to be used to download files. By default, the AirBEAM Smart Client uses the FTP protocol.
WNMS	This check box specifies whether the AirBEAM Smart Client uploads a WNMS information file at the end of each version synchronization.

Misc(2) Tab

This tab is used to configure various miscellaneous features.

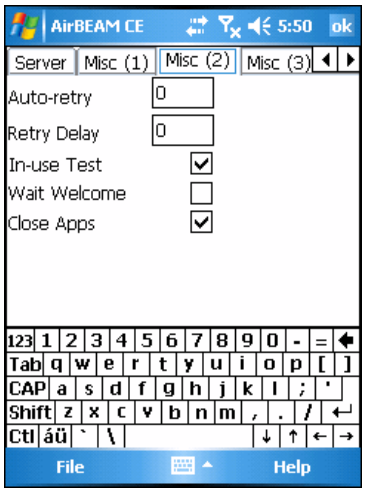


Figure 9-38 Misc (2) Tab

Table 9-6 Misc (2) Tab Descriptions

Field	Description
Auto-retry	This field is used to specify whether the AirBEAM Smart Client automatically retries if there is a failure during the synchronization process. If this feature is enabled, the AirBEAM Smart Client displays a popup dialog indicating the attempt of a retry. The popup dialog is displayed for the number of seconds specified in the *Retry Delay* field. The valid values for this field are: **-1**: the AirBEAM Smart Client automatically retries indefinitely. **0**: the AirBEAM Smart Client does not automatically retry. **-0**: the AirBEAM Smart Client automatically retries up to the number of times specified.
Retry Delay	This field specifies the amount of time, in seconds, that the AirBEAM Smart Client delays before automatically retrying after a synchronization failure.
In-use Test	This check box specifies whether the AirBEAM Smart Client tests to determine if a file is in-use before downloading. If the *In-use Test* feature is enabled, the AirBEAM Smart Client downloads a temporary copy of any files that are in-use. If any temporary in-

	use files are downloaded the AirBEAM Smart Client automatically resets the client to complete the copy of the in-use files. If the *In-use Test* feature is disabled, the synchronization process fails (-813) if any download files are in-use.
Wait Welcome	This check box specifies whether the AirBEAM Smart Client waits for the WELCOME windows to be completed before automatically launching the synchronization process after a reset.
Close Apps	This check box specifies whether the AirBEAM Smart Client automatically attempts to close non-system applications prior to resetting the mobile unit. If enabled the AirBEAM Smart Client sends a WM_CLOSE message to all non-system applications before resetting the mobile unit. This feature offers applications the opportunity to prepare (i.e. close open files) for the pending reset.

Misc(3) Tab

Use this tab to configure various miscellaneous features.

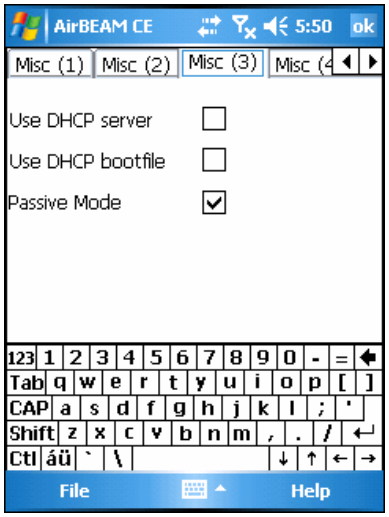


Figure 9-39 Misc (3) Tab

Table 9-7 Misc (3) Tab Descriptions

Field	Description
Use DHCP server	This check box control specifies whether the AirBEAM Smart Client uses the DHCP response option 66 to specify the *IP address* of the FTP/TFTP server. If enabled, special RF network registry settings are required to force the DHCP server to return the "TFTP server name" field (option 66). The special RF network registry settings are included, but commented out, in the radio network registry initialization files (essid_xxxx_yy.reg).
Use DHCP bootfile	This check box control specifies whether the AirBEAM Smart Client uses the DHCP response option 67 to specify the *Package* and *Package 1* parameters.

	If enabled, special RF network registry settings are required to force the DHCP server to return the “Bootfile name” field (option 67). The special RF network registry settings are included, but commented out, in the radio network registry initialization files (essid_xxxx_yy.reg).

Misc(4) Tab

Use this tab to configure various miscellaneous features.

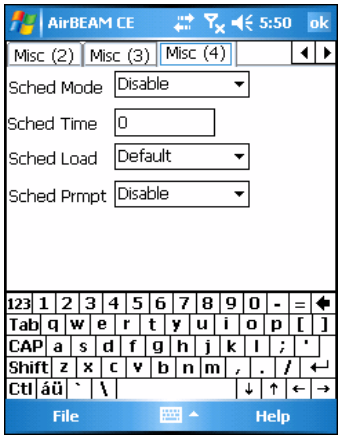


Figure 9-40 Misc (4) Tab

Table 9-8 Misc (4) Tab Descriptions

Field	Description
Sched Mode	Specifies whether (and how) the scheduled mode is enabled. If enabled, schedule mode causes the AirBEAM synchronization process to occur periodically. The selections are: **Disable** - The schedule mode is disabled. **Fixed time** - The schedule mode is enabled. The AirBEAM synchronization will be launched once per day at the time specified in the Sched Time setting. The synchronization will be launched every day Sched Time minutes past midnight. **Fixed period** - The schedule mode is enabled. The AirBEAM synchronization will be launched at a period by the Sched Time setting. The synchronization will be launched every Sched Time minutes.
Sched Time	This edit control specifies, in minutes, the period for the schedule mode. The Sched Mode setting specifies how the Sched Time value is used.
Sched Load	This drop-down menu specifies the load mode to be used for scheduled synchronization, if enabled. The selections are: **Default** - Specifies that the load mode specified in the Auto-load setting is to be used for scheduled synchronization sessions. **Interactive** - The Synchronization Dialog displays when a scheduled synchronization session occurs. The user is required to press the OK button to dismiss the dialog. **Non-interactive** - The Synchronization Dialog displays when a scheduled synchronization session occurs. The dialog is automatically dismissed when the synchronization is complete,

Field	Description
	unless an error occurs. If an error occurs the user is required to press the OK button to dismiss the dialog. **Background** - Nothing is displayed when the scheduled synchronization sessions occur.
Sched Prompt	Specifies whether the AirBEAM client prompts the user when updates are available in schedule mode. The settings are: **Disable** - Updated packages are automatically downloaded. The user is not prompted. **Alert** - Updated packages are not automatically downloaded. The user is prompted to warm boot the device to initiate the package downloads. **Launch** - Updated packages are not automatically downloaded. The user is prompted to start the package download. The user can defer the package download by responding no to the prompt. The MAXNOPRESS registry setting can be used to limit the number of times the user can defer the update. **Confirm** - Updated packages are not automatically downloaded. This value behaves the same as the Launch value, except that the user is required to confirm an additional prompt before the download starts.

Synchronizing with the Server

When the synchronization process is initiated, the AirBEAM Smart Client attempts to open an FTP session using the AirBEAM Smart Client configuration. Once connected, the client processes the specified packages. Packages are loaded only if the server version of a given package is different from the version loaded on the client. Once the upload process is complete, the AirBEAM Smart Client closes the FTP session with the server.

The AirBEAM Smart Client can launch an FTP session with the server either manually, when initiated by the user, or automatically.

Manual Synchronization

- Configure the AirBEAM Smart Client. See Configuring the AirBEAM Smart Client on page 177.
- From the main *AirBEAM CE* window, press **ALT** - **ALT** and select **Synchronize**.
- Once connected, the AirBEAM Synchronize window appears.

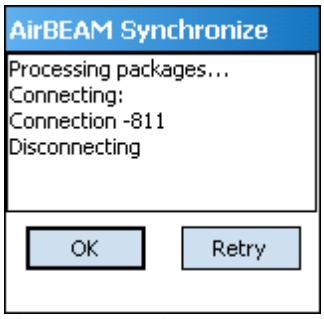


Figure 9-41 AirBEAM Synchronize Window

- The **Status List** displays status messages that indicate the progress of the synchronization process.
- Press **ENTER** to return to the Main Menu. This button remains inactive until the synchronization process is complete.

- Select **Retry** and press **ENTER** to restart the synchronization process. This button is activated only if there is an error during the synchronization process.

Automatic Synchronization

The AirBEAM Smart Client can be configured to launch automatically using the Misc(1) Preference tab (see Misc(1) Tab on page 179). When setting automatic synchronization, use the Auto-load drop-down list to specify how the AirBEAM Smart Client should be invoked automatically when the client device is rebooted. See Misc(1) Tab on page 179 for instructions on enabling Auto Sync.

Chapter 10 Troubleshooting

10.1 Introduction

This chapter includes instructions on cleaning and storing the HMR, and provides troubleshooting solutions for potential problems while operating the HMR.

10.2 Maintaining the RFID reader

For trouble-free service, observe the following tips when using the HMR:

- Take care not to scratch the screen of the HMR. When working with the HMR, use the supplied stylus or plastic-tipped pens intended for use with a touch-sensitive screen. Never use a pen or pencil or other sharp object on the surface of the HMR screen.
- Although the HMR is water and dust resistant, it is good practice not to expose it to rain or moisture for an extended period of time.
- The battery must be changed in a clean dry area.
- Protect the HMR from temperature extremes. Keep it away from heat sources.
- Do not store or use the HMR in any location that is extremely dusty, damp or wet.
- Use a soft cloth to clean the HMR. If the surface of the HMR becomes soiled, clean it with a soft cloth moistened with a diluted window-cleaning solution.

10.3 Battery Safety Guidelines

- The area in which the units are charged should be clear of debris and combustible materials or chemicals. Particular care should be taken where the device is charged in a non-commercial environment.
- Do not use incompatible batteries and chargers.
- Do not crush, puncture, or place a high degree of pressure on the battery.
- Severe impact from dropping any battery-operated device on a hard surface could cause the battery to overheat.
- Do not leave or store the equipment in or near areas that might get very hot, such as in a parked vehicle or near a radiator or other heat source. Do not place battery into a microwave oven or dryer.
- Do not dispose of batteries in fire.

10.4 Troubleshooting

Table 10-1 Troubleshooting the RFID reader

Problem	Cause	Solution
HMR does not turn on	Lithium-ion battery not charged.	Charge or replace the lithium-ion battery in the HMR.
	Lithium-ion battery not installed properly.	Ensure battery is installed properly. (See Installing and Removing the Main Battery on page 14.)
	System crash.	Perform a warm boot. If the HMR still does not turn on, perform a cold boot. (See Resetting the HMR on page 74.)
Rechargeable lithium-ion battery did not charge.	Battery failed.	Replace the battery. If the HMR still does not operate, try a warm boot, then a cold boot. (See Resetting the HMR on page 74.)
	HMR removed from cradle while battery was charging.	Insert HMR in cradle and begin charging. The lithium-ion battery requires less than four hours to recharge fully.
Cannot see characters on display.	HMR not powered on.	Press the **Power** button.
During data communication, no data was transmitted, or transmitted data was incomplete.	HMR removed from cradle or unplugged from host computer during communication.	Replace the HMR in the cradle, or reattach the Synchronization cable and re-transmit.
	Incorrect cable configuration.	See the System Administrator.
	Communication software was incorrectly installed or configured.	Perform setup. See Chapter 3, Accessories for details.
		Ensure that Microsoft ActiveSync 4.1 or greater is installed on the host computer.
No sound is audible.	Volume setting is low or turned off.	Unit may be a beeper only unit or incorrect Config Block is programmed into device.
HMR turns itself off.	HMR is inactive.	The HMR turns off after a period of inactivity. If the HMR is running on battery power, this period can be set to 30 sec., 1, 2, 3, 4, 5, or 6 minutes. If the HMR is running on external power, this period can be set to 1,

Problem	Cause	Solution
		2, 3, 4, 5, 10, 15, and 30 minutes. Check the power settings by tapping **Start** > **Settings** > **System** tab > **Power** icon > **Advanced** tab. Change the setting if a longer delay is required before the automatic shutoff feature activates.
	Battery is depleted.	Replace the battery.
	Battery is not inserted properly.	Insert the battery properly. (See Installing and Removing the Main Battery on page 14.)
Tapping the window buttons or icons does not activate the corresponding feature.	LCD screen not aligned correctly.	Re-calibrate the screen.
	Battery is not inserted properly.	Insert the battery properly. (See Installing and Removing the Main Battery on page 14.)
A message appears stating that the HMR memory is full.	Too many files stored on the HMR.	Delete unused memos and records. Save these records on the host computer.
	Too many applications installed on the HMR.	If additional applications have been installed on the HMR, remove them to recover memory. Tap **Start** > **Settings** > **System** tab > **Remove Programs** icon. Select the unused program and tap **Remove**.
The HMR does not accept scan input.	Scanning application is not loaded.	Verify that the unit is loaded with a scanning application. See the System Administrator.
	Unreadable bar code.	Ensure the symbol is not defaced.
	Distance between exit window and bar code is incorrect.	Ensure HMR is within proper scanning range.
	HMR is not programmed for the bar code.	Ensure the HMR is programmed to accept the type of bar code being scanned.
	HMR is not programmed to generate a beep.	If a beep on a good decode is expected and a beep is not heard, check that the application is set to generate a beep on good decode.
	Battery is low.	If the scanner stops

Problem	Cause	Solution
		emitting a laser beam when the trigger is pressed, check the battery level. When the battery level is low, the scanner shuts off before the HMR low battery condition notification.
WLAN connection is lost when the HMR is connected to a host computer using ActiveSync.	Microsoft security feature prevents connection to two separate networks.	Disconnect from the WLAN network prior to connecting to a host computer using ActiveSync.

10.5 Technical Support

Limited technical support is provided for the Intelleflex HMR-9090 Starter Kit. For technical assistance and reader service and repair, please contact Technical Support:

Toll-Free: 1-877-694-3539

International: +1-408-200-6500

-or-

E-mail support@intelleflex.com

If the reader needs to be returned for service, please fill out the warranty card included with developer's kit and call in to receive a Return Materials Authorization (RMA) number and instructions on how to return the reader or visit Intelleflex.com for more detail.

Appendix A Using iDockIt

A.1 Introduction

iDockIt™ manages the activities that can occur when you connect the HMR to a host computer using a cradle (Ethernet, modem, serial, USB) or USB or serial cable. iDockIt can enable the HMR to connect automatically to a host computer, network, or the Internet and then exchange information or launch an application. iDockIt lets you establish settings for each type of connection.

This appendix provides an overview of configuring iDockIt on HMRs running Windows Mobile 5.0.

General iDockIt options let you:

- Enable or disable iDockIt; if enabled, keep iDockIt running in the background.
- Display status and cradle settings when you cradle the HMR.
- Define whether iDockIt should wait before connecting or reconnecting the HMR to the host computer or network and if waiting, the number of seconds to delay.
- Disable specific error dialogs.

Connection-specific options let you define what iDockIt should do when you cradle or connect the HMR, including:

1. Launch Microsoft ActiveSync to synchronize with a host computer.
2. Establish a connection to your network.
3. Launch an application after establishing a network connection.
4. Establish a connection via a specified modem.

iDockIt settings and options control cradle events only while iDockIt is running.

A.2 Configuring iDockIt

To run iDockIt for the first time, tap **Start** > **Programs** from the Today screen and then tap the **iDockIt** icon; iDockIt opens to the **General** tab. Thereafter, if you need to restart **iDockIt**, tap **Start** > **iDockIt** from the Today screen.

When **iDockIt** is running, you see its icon at the bottom of the Today screen. Tap the icon to display the iDockIt menu.

1. **Status** displays the **Status** tab.

2. **Settings** displays the **Settings** tab for the current connection or, if the HMR is not connected to a host computer via a cable or cradle, the most recently viewed settings tab.
3. **Enable** is a toggle switch that checks/unchecks the **Enable iDockIt** setting on the **General** tab.
4. **Modem Connect** is enabled when you have defined a modem connection in the modem settings tab. Tapping this item when the HMR is in the modem cradle initiates dial-out.
5. **About** displays version and copyright information.
6. **Exit** disables iDockIt and closes the application.

iDockIt includes five tab pages:

1. **General** - General setup options for enabling/disabling iDockIt and displaying status and other information.
2. **Ethernet** - Settings for what iDockIt should do when it detects that the HMR is in an Ethernet cradle.
3. **Direct** - Settings for what iDockIt should do when it detects that the HMR is in a Serial or USB cradle or connected to a host computer using a Serial or USB cable.
4. **Modem** - Settings for what iDockIt should do when it detects that the HMR is in a Modem cradle.
5. **Status** - Current connection status, continuously updated, scrollable window.

Quick Start

Follow these guidelines. Refer to sections of this appendix devoted to individual tabs for details on settings and options.

How To Start iDockIt

To start iDockIt the first time, tap **Start** > **Programs** > **iDockIt**. Thereafter, tap **Start** > **iDockIt**.

How To Enable iDockIt To Manage Connections

On the iDockIt **General** tab, check **Enable iDockIt** to enable iDockIt to control cradle events. When you cradle the HMR, iDockIt identifies the cradle and perform the activities you have configured for it.

To connect automatically to a host computer or network:

- Tap the iDockIt **General** tab.
- Check **Enable iDockIt**.
- **Check or uncheck Display status when cradled**.
- **Check or uncheck Display settings when cradled**; the **Autoconnect** setting is also optional.
- Tap the **iDockIt** tab that corresponds to your cradle type and check **Establish network connection** and optionally **Launch application**.

To connect manually to your host computer or network:

While iDockIt is designed to connect your HMR to a specified host computer or network automatically, you can also choose your connection manually whenever you place the HMR in the cradle.

- Tap the iDockIt **General** tab.
- Check **Enable iDockIt**.
- **Check or uncheck Display status when cradled**.

- Check **Display settings when cradled**. When you place the HMR in the cradle, the **Settings** tab displays automatically.
- Uncheck the **Autoconnect** option.
- Tap the **iDockIt** tab that corresponds to your cradle type.
- Check **Establish network connection** and optionally **Launch application**.

When you place the HMR in a cradle, iDockIt displays the **Settings** tab corresponding to that cradle. Choose the type of connection and tap  . Another way to connect manually is to establish new connection settings before you place the HMR in the cradle.

To launch an application when you connect:

- Tap the iDockIt **General** tab.
- Check **Enable iDockIt**.
- Tap the tab that corresponds to the type of cradle you are using.
- Select a connection option as described above.
- Tap **Launch application**.
- Tap **Select** and select the application you want to launch when you place the HMR in the cradle. Enter any necessary program arguments.
- Tap **OK**.

The selected application appears in the settings tab.

To determine the HMR's connection status:

Tap the iDockIt **Status** tab.

- **Dock Status** shows either **Docked** and identify the type of connection (Serial, Ethernet, USB) when the HMR is placed in the cradle or **Not docked** when the HMR is removed from the cradle.
- **Connection** shows the name of the connection.
- When the HMR is placed in the cradle, IP addresses shows all valid IP addresses assigned to the HMR. If the HMR is not in the cradle, this field shows either the IP address of the network adapter or, if you there is no network connection, a default IP address.
- The **Status** window shows all cradle events that have occurred since the last time the HMR was placed in the cradle.

Minimize iDockIt

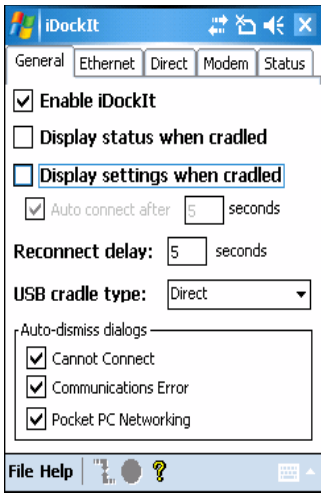
To minimize iDockIt, tap **X** in the upper right corner of the window. iDockIt controls cradle events while it is minimized.

Exit iDockIt

To close the application, tap **File** > **Exit**. iDockIt does not control cradle events when it is closed.

General Setup Options

Settings on the **General** tab complement the options you set for your cradle.



Enable iDockIt

Check this option to enable iDockIt to control cradle events. When you place the HMR in a cradle, iDockIt identifies the type of cradle and perform the activities you have configured.

Display Status When Cradled

Check this option to display the iDockIt **Status** tab when you place the HMR in the cradle. If you also checked **Display** settings when cradled, you first see the **Settings** tab for the type of cradle detected and then the **Status** tab after the specified time elapses.

Display Settings When Cradled

Check this option to display the cradle settings tab when you place the HMR in the cradle. You can also check **Auto connect after x seconds** to automatically make the connection defined on the cradle tab after a specific delay. The delay gives you the opportunity to review/change connection options. During this waiting period, you can select either or in the menu bar to connect immediately or cancel automatic connection.

Warning If **Display settings when cradled** is checked and **Auto connect after** is not checked, iDockIt only displays the cradle settings tab when you cradle the HMR and does not attempt to connect to your network.

Reconnect Delay

If iDockIt is configured to establish a connection when cradled and the connection is lost, iDockIt attempts to re-establish the connection if the HMR is still cradled (external power from the cradle is present). The Reconnect delay is used to specify the number of seconds iDockIt should wait after a connection is lost before attempting to reconnect.

USB Cradle Type

When placed into a USB cradle, iDockIt needs to know whether the cradle directly connects to a host computer or if the cradle connects to your network via an Ethernet cable. If you are using iDockIt to synchronize with a host computer using ActiveSync via USB cable or cradle, select **Direct**.

If you are using iDockIt to connect to your network though an Ethernet cradle, select **Ethernet**.

Auto-dismiss Error Dialogs

You can configure iDockIt to dismiss several error messages that might be displayed as iDockIt makes the connection you have defined. These messages do not require any action. To auto-dismiss a message, tap the checkbox next to its title. If the message occurs during a connection attempt, iDockIt allows it on your behalf and the event appears in the **Status** window.

1. **Cannot Connect** - The answering modem has disconnected. To check your connection settings and change them if needed, tap Settings.

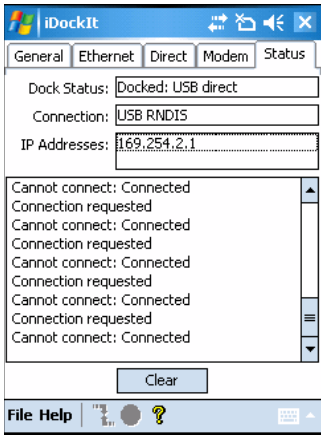
   What this message means: This message may be displayed when you remove the HMR from a cradle, breaking the connection. Tapping Settings would display the Pocket host computer Connections dialog. Since you should not need to change these settings, the error message can be dismissed automatically.
2. **Communications Error** - Cannot start communications with the desktop computer. Reconnect the HMR. If the problem persists, see Microsoft ActiveSync Help.

   What this message means: This message is displayed when ActiveSync® attempts to connect to a host computer and synchronize data but cannot find the computer name. Since this message may appear in the course of a successful connection attempt, it can be dismissed automatically.
3. **Pocket host computer Networking** - Unable to obtain a server-assigned IP address. Try again later or enter an IP address in Network settings.

   What this message means: If the HMR has a wireless network adapter, this dialog may appear periodically when the HMR is out of network range. The message has nothing to do with your connection through a cradle or cable and can therefore be dismissed automatically.

Status Tab

If iDockIt is enabled when you cradle/connect the HMR, the **Status** tab displays connection-related events as they occur. To display this tab automatically whenever you cradle/connect the HMR, check **Display status when cradled** on the **General** tab.



The **Dock Status** field shows **Docked** and identifies the type of connection (Serial, Ethernet, USB) when you have cradled the HMR or **Not docked** when you remove the HMR from the cradle.

The **Connection** field shows the name of the connection.

When you have placed the HMR in the cradle, the **IP addresses** field shows all valid IP addresses assigned to the HMR. When the HMR is not cradled, this field shows either

the IP address of your network adapter or, if you do not have a network connection, a default IP address.

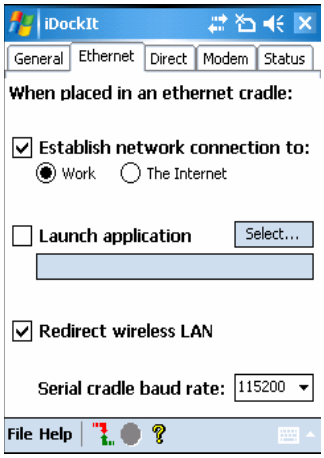
The **Status** window displays a scrolling list of cradle events as they occur, including:

1. AC power ON and OFF as you insert and remove the HMR.
2. **Carrier detect**, baud rate, and **(cradle type) connect** when iDockIt identifies the cradle and connection speed.
3. **Launch (application)** when iDockIt launches the selected application, followed by confirmation when the application has been launched successfully.
4. **Sync done** when synchronization has completed successfully.
5. **Dismiss (error message)** when iDockIt dismisses a message you have designated.
6. **Dock event complete** when iDockIt has completed all defined tasks. If you remove the HMR from the cradle before this item appears, regardless of dock status, you may interrupt assigned tasks.

Tap **Clear** to empty all events from the **Status** tab.

Ethernet Cradle Settings

If using an Ethernet cradle, you can establish an Internet or Intranet connection to your network and/or launch a specified application on the HMR.



Establish Network Connection

Check this option to have iDockIt establish a network connection when you cradle the HMR.

You can check this option in conjunction with **Launch application**. After iDockIt establishes the network connection, it launches the specified application.

Launch Application

Check this option to have iDockIt launch the selected application when you cradle the HMR. iDockIt uses the specified command line parameters. You must select an application to launch.

Select...

1. Tap Select to open the Select Auto-Launch Application dialog.
2. Select a File Type in the drop-down list.
3. Select a Folder (as needed).
4. Select a file name in the list.
5. Use the input panel to specify command line parameters.

6. Tap OK at the top of the screen.

The selected application appears in the settings tab.

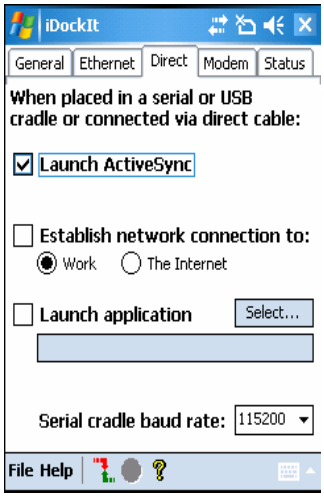
Serial Cradle Baud Rate

This option allows you to specify the baud rate iDockIt should use for a serial connection to the Ethernet cradle. Set this rate to match the baud rate configured for the cradle. For maximum performance, always use the maximum baud rate of 115200.

If using a USB-to-Ethernet cradle, the USB driver automatically determines the connection speed.

Direct (Serial/USB) Settings

If you use a serial or USB cradle or connect to the HMR with a serial or USB cable, you can automatically synchronize with the connected host computer. Alternatively, if your host computer supports RAS connections you can connect to a network through a host computer and/or launch a specified application on the HMR.



Launch ActiveSync

Check this option to have iDockIt launch ActiveSync when you place the HMR in a serial or USB cradle or when you connect it to a serial or USB cable. If the HMR has a partnership with the host computer to which you are connected, ActiveSync automatically synchronizes with the host computer.

Checking this option automatically unchecks **Establish network connection** and **Launch application**. Similarly, checking either one of those options automatically unchecks **Launch ActiveSync**.

Establish Network Connection

Check this option to have iDockIt establish a connection to your network when you place the HMR in a serial or USB cradle or connect it to a serial or USB cable. In order to establish a connection to your network, you must connect the HMR to a host computer with a RAS server.

If you check this option, **Launch ActiveSync** is automatically unchecked.

You can check this option in conjunction with **Launch application**. After iDockIt establishes the network connection, it launches the specified application.

Launch Application

Check this option to have iDockIt launch the selected application when you place the HMR in a serial or USB cradle or connect it to a serial or USB cable. iDockIt uses the specified command line parameters. You must select an application to launch.

Select…

1. Tap **Select** to open the **Select Auto-Launch Application** dialog.
2. Select a **File Type** in the drop-down list.
3. Select a Folder (as needed).
4. Select a file name in the list.
5. Use the input panel to specify command line parameters.
6. Tap **OK** at the top of the screen.

The selected application appears in the settings tab.

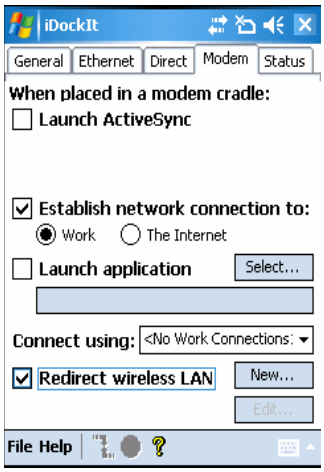
Serial Cradle Baud Rate

This option allows you to specify the baud rate iDockIt should use for a serial cable or cradle. Set this rate to match the host computer that the cradle or cable is connected to.

If you are using a USB cradle or cable, the USB driver automatically determines the connection speed.

Modem Cradle Settings

If you use a modem cradle, you can automatically connect to a remote host computer or network or you can synchronize with a host computer with which you have set up a partnership using ActiveSync. Alternatively, you can connect to your network and/or launch a specified application on the HMR.



Launch ActiveSync

Check this option to have iDockIt launch ActiveSync when you place the HMR in a modem cradle.

Checking this option automatically unchecks Establish network connection and Launch application. Similarly, checking either one of those options automatically unchecks Launch ActiveSync.

Establish Network Connection

Check this option to have iDockIt establish a network connection when you place the HMR in a modem cradle. iDockIt uses the modem connection specified in the **Connect using** list in this tab.

If you check this option, **Launch ActiveSync** is automatically unchecked.

You can check this option in conjunction with **Launch application**. After iDockIt establishes the network connection, it launches the specified application.

Launch Application

Check this option to have iDockIt launch the selected application when you place the HMR in a modem cradle. iDockIt uses the specified command line parameters. You must select an application to launch. If Establish network connection is checked, the application does not launch until a connection is successfully established.

Select...

1. Tap **Select** to open the **Select Auto-Launch Application** dialog.
2. Select a **File Type** in the drop-down list.
3. Select a Folder (as needed).
4. Use the input panel to specify command line parameters.
5. Select a file name in the list.
6. Tap **OK** at the top of the screen.

The selected application appears in the settings tab.

Choose Connection

The **Connect using** drop-down list includes all modem connections that you have defined for the HMR. Choose the one you wish to use.

If you check the General settings options to **Display settings when cradled** and **Auto-connect after x seconds**, you have an opportunity to select the appropriate modem connection when you cradle the HMR.

If you do not check the above options, iDockIt uses the last modem connection you selected.

Tap **New** to create a new modem connection.

Tap **Edit** to change the settings of an existing modem connection.

Tap **Delete** to delete the currently displayed modem connection.

Create A New Modem Connection

1. Get the following information from your ISP or network administrator: dial-up access telephone number, user name, password, domain name, and TCP/IP settings.
2. Tap **New** below the **Connect using** list.
3. Enter a name for the connection.
4. In the Modem list, tap your modem type. For the modem cradle, tap **Hayes Compatible on COM1**.
5. Tap **Configure** and change any Port Settings in the Connection Properties dialog, depending on requirements for your modem.
6. Tap **Next** after entering the connection name and choosing a modem.
7. Enter the access phone number and then tap **Next**.
8. Enter Login information (user name, password, and domain name) and then tap **Next**.

9. You should not need to change any TCP/IP settings unless directed by your ISP or network administrator. Tap **Next** and then tap **Finish** in the next server address dialog.

The new modem connection is in the drop-down list.

Edit an Existing Modem Connection

- In the **Connect using** list, select the modem connection you need to modify.
- Tap **Edit**.
- In the **Connection Properties** dialog, make any necessary changes to the connection name, modem, or modem configuration options. Tap **Next** to continue or **OK** to close the dialog.
- If you continue, you can change the access phone number. Tap **Next** to continue or **OK** to close the dialog.
- If you continue, you can change your login information. If you need to make any TCP IP setting changes, tap **Next**. Otherwise, tap **OK** to close the dialog.

Delete an Existing Modem Connection

- In the **Connect using** list, select the modem connection you want to delete.
- Tap and hold the **Connect using** box until the pop-up menu displays.
- Select **Delete** from the pop-up menu.
- A dialog is displayed prompting you to conform that you want to delete the modem connection. Tap **Yes**.

The modem connection is removed from the drop-down list.

A.3 Un-installing iDockIt

- Exit iDockIt.
- In the **System** tab, tap the **Remove Programs** icon.
- Select **InVision iDockIt** in the program list.
- Tap **Remove** and select **Yes** in the **Remove Program** dialog.
- Tap **OK**.

Appendix B Technical Specifications

B.1 Technical Specifications

The following table summarize the HMR's intended operating environment and general technical hardware specifications.

HMR

The following table summarizes the reader technical specifications.

Item	HMR
Physical and Environmental Characteristics	
Dimensions	9.1 in. L x 3.6 in. W x 7.6 in. H 23.1 cm L x 9.1 cm W x 19.3 cm H
Weight	25 oz. (includes battery, scanner, and radio)
Keyboard	53-key
Display	3.8 in. ¼ VGA Color
Battery	Removable, rechargeable 7.2 volt Lithium Ion 2200 mAh battery pack, 15.8 watt hours
Performance Characteristics	
CPU	Intel® XScale® Bulverde PXA270 processor at 624MHz
Operating System	Microsoft Windows Mobile 5.0 Premium Edition
Memory (RAM/ROM)	Windows Mobile: 64MB/128MB
Expansion	SD/MMC Card
Application Development	SMDKs available through the Support Web Site
Data Capture Options	Omni-directional 1D and 2D imaging engine reads symbologies and captures grayscale images and signatures with intuitive laser aiming. 1D Standard Range scan engine C1G2 and C3 tags
Laser Decode Capability	• Code 39 • Code 128 • Code 93 • Codabar • Code 11 • Discrete 2 of 5 • Interleaved 2 of 5 • EAN-8 • EAN-13 • MSI • UPCA • UPCE • UPC/EAN Supplementals • Coupon Code • Trioptic 39 • Webcode • RSS-14 • RSS Limited • RSS Expanded HMR with Windows Mobile 5.0 and OEM Version 01.39.0001 and higher: • Chinese 2 of 5

Item	HMR		
Imaging Decode Capability	• Australian 4-state	• Canadian 4-state	• Codabar
	• Code 11	• Code 39	• Code 93
	• Code 128	• Composite AB	• Composite C
	• Coupon Code	• Data Matrix	• Discrete 2 of 5
	• Interleaved 2 of 5	• Dutch Kix	• EAN-8
	• EAN-13	• Japanese 4-state	• (Macro) Micro PDF-417
	• Macro PDF-417	• Maxi Code	• Micro PDF-417
	• MSI	• PDF-417	• QR Code
	• RSS Expanded	• RSS Limited	• RSS-14
	• TLC39	• Trioptic 39	• UK 4-state
	• UPC/EAN Supplementals	• UPCA	• UPCE
	• US Planet	• US Postnet	• Webcode
	HMR with Windows Mobile 5.0 and OEM Version 01.39.0001 and higher:		
	• Chinese 2 of 5	• USPS 4-state (US4CB)	• Aztec
	• microQR		
User Environment			
Operating Temperature	-4°F to 122°F (-20°C to 50°C)		
Battery Charging Temperature	32°F to 104°F (0°C to 40°C) ambient temperature range		
Storage Temperature	-25°F to 160°F (-40°C to 70°C)		
Humidity	5% to 95% non condensing		
Drop Specification	Multiple 6 ft. (1.8m) drops to concrete across operating temperature range		
Tumble	2,000 one-meter tumbles at room temperature (4,000 hits)		
Environmental Sealing	IP64		
ESD	+/- 15kVdc air discharge +/- 8kVdc direct discharge +/- 8kVdc indirect discharge		
RFID			
Standards Supported	• EPC Global C1G2 • ISO/IEC 18000-6:2010		
Field	Half read range beam width: +/- 80 degrees (with tags optimally oriented)		
Antenna	Integrated, circularly polarized, 1.5 dB effective line gain per axis (nominal);		
Frequency Range	902-928 MHz		
Output power	1W conducted (1.4W EIRP with integrated antenna)		

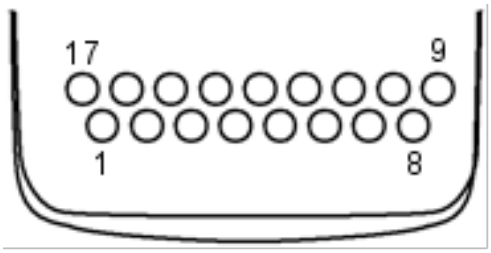
Item	HMR
Wireless Data Communications	
WLAN	802.11a/b/g
Output Power	100mW U.S. and International
Data Rate	802.11a: 54 Mb per second 802.11b: 11 Mb per second 802.11g: 54 Mb per second
Antenna	Internal
Frequency Range	802.11a: 5 GHz; country-dependent 802.11b: 2.4 GHz; country-dependent 802.11g: 2.4 GHz; country-dependent
Bluetooth	Bluetooth® Version 1.2 with BTExplorer™ (manager) included
Peripherals and Accessories	
Cradles	Single-slot and 4-slot cradles available
Printers	Supports extensive line of printers, cables, and accessories
Charger	4-Slot universal battery charger
Other Accessories	Cable Adapter Module; Magnetic Stripe Reader; Modem; Full set of holsters in accordance with the SymbolPlus partner program
Regulatory	
Electrical Safety	Certified to UL60950-1, CSA C22.2 No. 60950-1, EN60950-1, IEC 60950-1.
WLAN and Bluetooth	USA – FCC Part 15.247, 15.407; Canada – RSS-210.
RF Exposure	USA – FCC Part 2, FCC OET Bulletin 65 Supplement C; Canada – RSS-102.
RFID	USA – FCC Part 15.247, 15.205, 15.209; Canada – RSS-210.
EMI/RFI	USA – FCC Part 15; Canada – ICES 0003 Class B.

Modem Module

Item	Description
Asynchronous character format	Up to 10 bits, including data, start, stop, and parity bits
Asynchronous data rates	Transmission rate fallback through 300 bps
Chipset	Conexant SCM
Compatible public switched network jacks	RJ11
Dialing capability	Tone and rotary pulse
Line requirements	Public switched telephone network (PSTN) including international connections
Operating environment	• Altitude: up to 20,000 ft. • Humidity: 10% to 90% non-condensing
Operating temperature	Operating: 32°F to 122°F (0°C to 50°C) Storage: -4°F to 149°F (-20°C to 65°C)
Operating modes	Asynchronous, full duplex, automatic and manual call originate
Performance	Line speed up to 33,600 bps HHC to modem speed (DTE speed) up to 57,600 bps V.42bis data compression V.42 LAPM error correction
Current consumption	100 mA active <10 mA sleep
Pulse dialing rate (except where prohibited under TBR-21 rules)	10 pulses per second Pulse dialing duty cycle: 39/61% (US) make-to-break ratio
Ringer equivalence	0.1 dBm
Standards & protocols	Bell 103, Bell 212A, Hayes AT command set, and ITU Vs. 17, 21, 22 A & B, 22bis, 23, 25bis, 27 ter, 29, 32, 32bis, 42bis
Tone detected	Dial, busy, ring back, modem answer tones. Blind dialing based on time-out periods available for incompatible tones.
AC Adapter	9V, 2 amp regulated AC/DC adapter allows unlimited modem use. Do NOT substitute an AC adapter; using an incorrect AC power supply causes electrical damage to the HMR and voids the warranty.

B.2

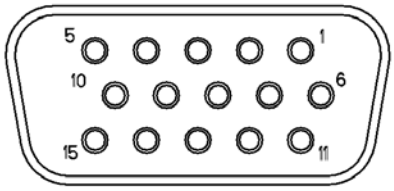
B.3 HMR Pin-Outs



PIN Number	Signal Name	Function
1	USB_GND	USB
2	USB_D_PLUS	USB
3	TXD	RS232C
4	RXD	RS232C
5	DCD	RS232C
6	RTS	RS232C
7	DSR	RS232C
8	GND	Ground, 2.5A max.
9	RI	RS232C
10	CRADLE_DET	Grounded by cradle when in cradle
11	DTR	RS232C
12	Not connected	Not connected
13	POWER_IN	12V, 2.5A max
14	CTS	RS232C
15	USB_5V_DET	USB
16	USB_D_MINUS	USB
17	EXT_PWR_OUT	3.3V @500mA

B.4

B.5 Accessory CAM and MSR Pin-Outs



Pin	Signal
1	USB_5V_DET
2	USB_D_MINUS
3	USB_D_PLUS
4	GND
5	GND
6	PWR_EXT_OUT
7	CRADLE_DET*
8	DSR
9	DCD
10	TXD
11	CTS
12	DTR
13	RI
14	RTS
15	RXD

Appendix C Keypad Special Keys

C.1 Introduction

This appendix contains the keypad functions/special characters for the keypad. Each function/special character is included in the table along with how the function/special character is generated.

C.2 Keypad

The HMR is available with the following keypad:

- 53-key RFID keypad

The keypad contains a **Power** button, application keys, scroll keys, and function keys. The keypad is color-coded to indicate the alternate function key (blue) values. See the table below for the special character generation. Characters can also be generated using the keyboard input panel.

Special Character	Description	53-Key Keypad
[	Open square bracket	Blue Key – **E**
]	Close square bracket	Blue Key – **F**
/	Forward slash	Blue Key – **L**, Blue Key – **V**
\	Backslash	Blue Key – **G**
=	Equal sign	Blue Key – **W**
;	Semi-colon	Blue Key – **R**
`	Grave accent	Blue Key – **J**
,	Comma	Blue Key – **A**
.	Period	Blue Key – **B**
!	Exclamation point	**SHIFT** – **1**
@	At sign	**SHIFT** – **2**
#	Pound sign	**SHIFT** – **3**
$	Dollar sign	**SHIFT** – **4**
%	Percent sign	**SHIFT** – **5**
^	Carat	**SHIFT** – **6**
&	Ampersand	**SHIFT** – **7**
*	Asterisk	Blue Key – **U**, **SHIFT** – Blue Key – **U**, **SHIFT** – **8**
(	Open parenthesis	**SHIFT** – **9**
)	Close parenthesis	**SHIFT** – **0**
‘	Single quote	Blue Key – **C**
“	Double quote	**SHIFT** – Blue Key – **C**
+	Plus sign	Blue Key – **S**, **SHIFT** – Blue Key – **S**, **SHIFT** – Blue Key – **W**
-	Dash	Blue Key – **N**, Blue Key – **T**, **SHIFT** – Blue Key – **T**
:	Colon	**SHIFT** – Blue Key – **R**
<	Less than sign	**SHIFT** – Blue Key – **A**
>	Greater than sign	**SHIFT** – Blue Key – **B**
?	Question mark	**SHIFT** – Blue Key – **L,**

Special Character	Description	53-Key Keypad
		SHIFT – Blue Key – **V**
_	Underscore	**SHIFT** – Blue Key – **N**
{	Open curly bracket	**SHIFT** – Blue Key – **E**
}	Close curly bracket	**SHIFT** – Blue Key – **F**
~	Tilde	**SHIFT** – Blue Key – **J**
|	Pipe	**SHIFT** – Blue Key – **G**

Appendix D Regulatory

D.1 Accessory Power Supply Regulatory Compliance

Accessory	Power Supplies Regulatory Compliance Statements
• Single Slot Serial/USB Cradle Power Supply • Magnetic Stripe Reader (MSR) • Cable Adapter Module (CAM)	Use only an Intelleflex-approved power supply output rated 12 VDC and minimum 3.3 A. The power supply is certified to EN60950 with SELV outputs. Use of an alternative power supply will invalidate any approval given to this device and may be dangerous.
• Four Slot Charge Only Cradle Power Supply • Four Slot Ethernet Cradle Power Supply	Use only an Intelleflex -approved power supply output rated 12 VDC and minimum 9 A. The power supply is certified to EN60950 with SELV outputs. Use of an alternative power supply will invalidate any approval given to this device and may be dangerous.
• Universal Battery Charger (UBC) Adapter Power Supply	Use only an Intelleflex -approved power supply output rated 15 VDC and minimum 1.5 A. The power supply is certified to EN60950 with SELV outputs. Use of an alternative power supply will invalidate any approval given to this device and may be dangerous.
• Four Slot Spare Battery Charger Power Supply	Use only an Intelleflex -approved power supply output rated 15 VDC and minimum 5 A. The power supply is certified to EN60950 with SELV outputs. Use of an alternative power supply will invalidate any approval given to this device and may be dangerous.

D.2 Taiwan Regulatory Statement

NCC Statement – For General 2.4G & 5G Products

Article 12

Without permission, any company, firm or user shall not alter the frequency, increase the power, or change the characteristics and functions of the original design of the certified lower power frequency electric machinery.

低功率電波輻性電機管理辦法

第十二條經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

Article 14

The application of low power frequency electric machineries shall not affect the navigation safety nor interfere a legal communication if an interference is found, the service will be suspended until improvement is made and interference no longer exists.

第十四條低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。

前項合法通信，指依電信規定作業之無線電信。低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

Additional NCC Statement – For 5G Band Products

The electric machineries operating at 5.25GHz ~ 5.35GHz is limited to indoor use only.

在5.25G ~5.35G頻帶內操作之無線資訊傳輸設備僅適於室內使用

D.3 Declaration of Conformance

Declaration of Conformity to the R&TTE Directive

Intelleflex Corporation
2465 Augustine Drive, Suite 102
Santa Clara, CA 95054

Declare under our sole responsibility that the product

Product Name:	Intelleflex
Model Number:	HMR-9090-EU
Product Type:	UHF RFID Reader

Conforms to the following Product Specifications

to which this declaration relates is in conformity with the essential requirements and other relevant requirements of the R&TTE Directive (1999/5/EC).
The product is in conformity with the following standards and/or other normative documents:

HEALTH & SAFETY (Art. 3(1)(a)): EN 60950-1: 2006 + A11

EMC (Art. 3(1)(b)): EN 301 489-3 v1.4.1 (2002-08)
EN 55022: 206 +A1: 2007
EN 55024: 1998 + A1: 2001 + A2: 2008

Limitation of validity (if any): N/A
Supplementary information:
Notified body involved: N/A.....
Technical file held by: N/A

Place and date of issue (of this DoC): Santa Clara CA U.S.A.

Signed by or for the manufacturer: .....
(Signature of authorised person)

Name (in print): .....Russell Shikami.....
Title: .....Vice President, Operations.....